

A Revision of the African Spider Genus *Raecius* Simon, 1892 (Araneae, Zorocratidae)

by

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The tropical African spider genus *Raecius* Simon, 1892 is defined and revised and a key to the five valid species is provided. *Raecius congoensis*, *R. jocquei* and *R. scharffi* new species are described. *Mnesitheus vittatus* Simon, 1907 and *M. zoropsides* Strand, 1916 are new junior synonyms of *Raecius asper* (Thorell, 1899). *Raecius aculeatus* Dahl, 1901 is excluded from the genus and is *incertae sedis* in Zorocratidae.

Raecius are cryptic spiders in their habits and history. They are rare in collections, usually collected singly or a few at a time, and the only series in collections have resulted from mass collecting through pitfall trapping or concerted efforts to dig them from burrows. *Raecius* occur in the disjunct, Afromontane forests (Griswold 1991a; White 1978, 1983) in tropical Africa (e.g., Mt. Cameroon, Bioko Island, the Eastern Arc mountains of Tanzania) but are not restricted to these habitats, occurring as well in lowland forests and arid areas. In this, the 16th in a series of monographs on spiders occurring in the Afromontane region (Griswold 1985, 1987b, 1987c, 1987d, 1990, 1991b, 1994, 1997a, 1997b, 1998a, 1998b, 2000, 2001; Griswold and Platnick 1987; Griswold and Ledford 2001), I revise the genus *Raecius* and discuss its taxonomic placement in the Zorocratidae.

The spiders placed in *Raecius* have a complex and confused taxonomic history. Indeed, for much of the 20th century synonyms of the same species were placed in different families, the Tenggellidae and Zoropsidae. Koch (1875:32) described the first *Raecius* species from a juvenile from Ethiopia (in what is today Eritrea). He called it *Amaurobius crassipes*, which he placed in the Agelenidae. Simon (1892:230) proposed the genus *Raecius* for Koch's species and placed it in the Zoropsidae along with the genera *Zoropsis* and *Zorocrates*. Thorell (1899:18) proposed *Mnesitheus asper* for a female spider from Mt. Cameroon that he placed in the Dictynidae. Simon (1903:975) listed *Mnesitheus* in the Dictynidae, and in 1907 described another species *M. vittatus* from Bioko Island (Simon 1907:227). In 1916 Strand described a male spider from Mt. Cameroon as *Mnesitheus zoropsides* (Strand 1916:140). Dahl (1901a, 1901b, 1913) treated *Raecius* and *Mnesitheus* in the Zorocratidae, but this placement was not followed by subsequent workers. Petrunkevitch (1928) listed *Raecius* in the Zoropsidae and *Mnesitheus* in the Tenggellidae, a placement followed by Roewer (1954) and Bonnet (1957, 1958). It was not until Lehtinen's comprehensive study of type specimens of cribellate spiders that the synonymy of these genera was recognized (Lehtinen 1967:250, 262). Lehtinen synonymized *Mnesitheus* with *Raecius*, and transferred the latter genus into his Miturgidae, Uliodoninae. I undertook the first quantitative phylogenetic analysis of exemplars for taxa placed in the Tenggellidae,

Miturgidae, Zoropsidae and Lycosoidea (Griswold 1993). This analysis treated taxa that had one or more classical (i.e., grate-shaped tapetum) or newly discovered characters (e.g., male tibial crack, oval calamistrum, and/or interlocking lobes on the tegulum and subtegulum of the male pedipalpal bulb). Significant results were that *Raecius* formed a clade along with the other former miturgid genera *Campostichomma*, *Zorocrates*, *Zorodictyna*, and *Uduba*. These taxa were not closely related to Miturgidae (represented in that study by *Uliodon tarantulinus*) but no family transfer was made. Within this clade the entire cribellum suggested that the Malagasy genus *Zorodictyna* and African *Raecius* are sister groups. Griswold, Coddington, Platnick, and Forster (1999) examined an even broader array of araneomorph taxa. Their phylogenetic analysis suggested that the former miturgid genera *Raecius* and *Uduba* (and by implication, *Campostichomma*, *Zorocrates*, and *Zorodictyna*) comprise the family Zorocratidae Dahl 1913. Synapomorphies of Zorocratidae are the male tibial crack, clumped cribellar spigots (Figs. 19, 21), and a male pedipalpal tibia ventroapical process (Figs. 22, 38).

Comparison to *Zorodictyna* and more distantly related zorocratids suggests several synapomorphies for *Raecius*. The long, narrow carapace (Fig. 1) contrasts with the oval carapaces of other zorocratids. The flattened, ribbon-like embolus (Figs. 37, 51) and blunt embolic tip (Figs. 40, 62) may be additional *Raecius* synapomorphies as other zorocratids have cylindrical or attenuate emboli (Griswold 1993, figs. 11, 13, 20, 34). Phylogenetic resolution within *Raecius* is difficult because *R. congoensis* is known only from females and *R. scharffi* only from males, but at least the enlarged RTA may be a synapomorphy uniting *R. asper* and *R. jocquei*.

The sister group relationship of *Raecius* and the Malagasy *Zorodictyna* is of particular interest, being one of at least five documented cases of Madagascar-tropical African montane, vicariant sister group relationships (Griswold 2000). Four other parallel patterns occur within Cyatholipidae (within *Ulwembua* and between *Alaranea* and *Scharffia*) and Phyxelididae (within *Phyxelida* and between *Ambohima* and *Kulalanina*). This corroborates the hypothesis in Griswold (1991a) suggesting that Madagascar is related to areas in tropical East and South Africa. This tropical African-Madagascar vicariance pattern parallels that suggested for lemurs (Yoder et al. 1996) and tenrecs (Asher 1997). Recent molecular clock evidence suggests that the mammalian disjunctions may be Eocene in age (Yoder et al. 1996), and a land bridge along the Davie Fracture Zone has been postulated as a path for dispersal from Africa to Madagascar at this time (McCall 1997). The replicated biogeographic pattern among spiders may also result from dispersal during the early Tertiary.

METHODS

Species descriptions represent a single individual of each sex that is noted at the head of each description. The section on variation represents the variability in several individuals of each sex chosen to represent the full range of overall size. All measurements are in millimeters. The length and width of the cephalothorax and abdomen were measured from above and represent maximum values; chelicerae were excluded from cephalothorax length but included in measurements of total length; carapace height was measured from the side and represents the maximum height; the ocular area was measured from above with the dimensions of the ocular quadrangle being measured from the outer margin of the eyes; the posterior eye row was measured from above and the anterior eye row was measured from in front; eye interdistances are abbreviated, e.g., AME-AME = distance between anterior median eyes, ALE-PLE = distance between lateral eyes; clypeal height represents the distance from the median margin of the clypeus to the lower margin of the AME; cheliceral length comprises the distance from the median margin of the clypeus to the apex of the paturon (not including the fang); lengths of leg segments were measured along the dorsal margin as in Griswold (1987a). Spines are reported for the dorsal (d), prolateral (p), ventral (v), and retrolateral (r) surfaces of the legs and pedipalpi and are noted from the proximal to distal ends of each segment. Abbreviations for the ocular

region (AME, ALE, PME, PLE, AER, PER) and legs are standard for the Araneae. A list of abbreviations used to refer to special morphological features is presented in Table 1. Label data are quoted verbatim in the listings of material examined.

Tracheae were examined by first dissecting off the dorsal cuticle of the abdomen, digesting away nonchitinous tissue in 10 percent potassium hydroxide (KOH) either warmed beneath a desk lamp for 72–120 hours or boiled for 5–10 minutes, and then staining the tracheae and other chitinous structures in Chlorazol Black. Male pedipalpi were expanded by immersing them overnight in a weak, watery solution of KOH and transferring them to distilled water where expansion continued. Pedipalpi were transferred back and forth between KOH and distilled water until expansion stopped. Female genitalia were excised from the abdomen, cleaned in a solution of trypsin and water, and illustrated. Pedipalpi and vulvae were examined in alcohol and in lactic acid. Subsequently, to allow examination of internal structures, vulvae were bleached through brief immersion at room temperature in a 5.25% sodium hypochlorite solution (CLOROX® household bleach). Bleaching provided rapid, excellent clearing of even the most heavily sclerotized genitalia with no apparent distortion of features. Vulvae were then stained lightly with Chlorazol Black, temporarily mounted in lactic acid, and examined with a compound microscope. Terminology for parts of the vulva follows Sierwald (1989). Prior to examination with a Hitachi S-520 Scanning Electron Microscope all structures were cleaned in an ultrasonic cleaner: pedipalpi and female genitalia were critical point dried, other structures were air dried. Spinnerets were prepared by first causing full extension by squeezing the abdomen with forceps, locking the forceps in position with a paper clip, and transferring the spider and forceps to absolute ethanol for 24 hours. The whole abdomen was then cleaned with an ultrasonic cleaner, critical point dried, and mounted on a stub using Elmer's Glue. Tapeta in the indirect eyes were examined in living or freshly dead specimens as in Griswold (1993). Specimens were examined with a Wild M5A, Olympus SZH or Leica MZAPO stereomicroscope, and/or a Nikon compound microscope modified for 3 dimensional imaging by SL3D, Inc., and drawings were made with a mounted phototube (camera lucida).

TABLE 1. Abbreviations for morphological terms used in text and figures.

AC – aciniform gland spigot(s)	ML – median lobe of epigynum
AER – anterior eye row	MS – median sector of epigynum
ALE – anterior lateral eyes	N – nubbin
ALS – anterior lateral spinneret	OAL – length of ocular area
AME – anterior median eyes	OQA – ocular quadrangle, anterior
AN – anelli	OQL – ocular quadrangle, length
C – conductor	OQP – ocular quadrangle, posterior
BS – base of spermatheca	P – petiole
CD – copulatory duct	PER – posterior eye row
CY – cylindrical gland spigot(s)	PI – piriform gland spigot(s)
DTA – dorsal apophysis of tibia	PLE – posterior lateral eyes
E – embolus	PLS – posterior lateral spinneret
EF – epigynal fold	PME – posterior median eyes
FD – fertilization duct	PMS – posterior median spinneret
HS – head of spermatheca	PsFl – pseudoflagelliform gland spigot(s)
ITC – inferior tarsal claw	RTA – retrolateral apophysis of tibia
LL – lateral lobes of epigynum	ST – subtegulum
MA – median apophysis of tegulum	STP – sclerotized tegular process
MAP – major ampullate gland spigot(s)	T – tegulum
mAP – minor ampullate gland spigot(s)	VTA – ventral apophysis of tibia

Throughout the text references to figures from other papers are noted in lower case (fig.), whereas references to figures accompanying this paper are capitalized (Fig.).

NATURAL HISTORY

Raecius have been observed in the field in Cameroon, on Bioko Island, Equatorial Guinea and in Tanzania. They occur in lowland and montane forest (Fig. 26) and in montane grassland (Fig. 27) and at least *R. asper* occurs in both montane forest and montane grassland. The type of *R. crassipes* was taken in a dry riverbed in northern Eritrea, a habitat much drier than that of other *Raecius* species. They are burrowing or tube building spiders that line their burrows with silk and provide the entrance with a collar of cribellate silk (Fig. 25). Burrows of *R. asper* from Mt. Cameroon were 6–8 cm deep, and straight or slightly curved. In forest, burrows are typically made in rotting fallen logs, or silken tubes or tunnels may be made in moss on tree trunks. In grassland the burrows are in turf and may be abundant. In burned grassland in January on Mt. Cameroon (Fig. 27), when the burrows were most conspicuous, 3 person-hours of collecting revealed more than 70 individuals. Many adult females at this locality had egg sacs or young in the burrow. These egg sacs were thickly wrapped with silk and covered with dirt or other debris. Populations from forest and grassland on Mt. Cameroon differed in phenology. Two egg sacs collected in mist forest at 1425 m had only eggs within (37 and 41 eggs), whereas sixteen egg sacs collected during the same week from grassland at 2050 m had juveniles or were already empty. Of these sixteen, nine were empty and seven had 23 to 55 (average 42) juveniles. A female from Mt. Kupé had an egg sac containing approximately 110 eggs. One to two egg sacs could be found in a female's tube, with one sac always more advanced phenologically than the other. A captive individual of *R. scharffi* captured prey with a grab and bite. Prey was carried in the chelicerae and was not wrapped. Captive individuals of both *R. asper* and *R. scharffi* carded cribellate silk using legs IV braced against each other and moved simultaneously. This "mobile leg IV" carding is typical of entelegynes (Eberhard 1988, Griswold et al. 1999). Cribellate silk has both axial lines and reserve warp.

TAXONOMY

Raecius Simon, 1892

Raecius Simon, 1892:230 (type species *Anaurobius crassipes* L. Koch 1875:32, from Eritrea, in BMNH, examined, described in Agelenidae). Petrunkevitch 1928:146. Roewer 1954:1283. Bonnet 1958:3846. Lehtinen 1967:250 (transferred to Miturgidae). Brignoli 1983:544. Platnick 1989:432; 1993:598; 1997:682; 2002. Griswold et al. 1999:59 (transferred to Zorocratidae).

Mnesitheus Thorell, 1899:18 (type species *Mnesitheus asper* Thorell, from Cameroon, in RMS, examined, described in Dictynidae). Simon 1903:975. Petrunkevitch 1928:91. Roewer 1954:1379. Bonnet 1957:2968. Synonymized by Lehtinen 1967:250.

DIAGNOSIS. — Zorocratid spiders with entire cribellum (Figs. 18–19) and oval calamistrum (Fig. 8) that differ from *Zorodictyna* in having feathery hairs (Figs. 6, 9, 43) and lacking a dorsobasal projection of the cymbium, and that differ from all other zorocratids in the flattened, ribbon-like embolus (Figs. 37, 51), blunt embolic tip (Figs. 40, 62), and elongate carapace with length 1.47 to 1.90 times width (Fig. 1).

DESCRIPTION. — Medium sized to large spiders, total length 4.68–15.73; sexual dimorphism slight, male with relatively longer legs. Carapace elongate-oval in dorsal view (Figs. 1, 24), length 1.47 to 1.90 times width, domed (Fig. 2), height 0.38 to 0.74 times width; fovea linear, deep. Ocular area broad, PER width 2.34–4.87 times OA length; ocular quadrangle rectangular to trapezoidal, in most specimens widest behind, OQP/OQA 0.93–1.36; eight eyes in 2 nearly straight rows, indirect

eyes with canoe-shaped tapetum. Clypeus low, height 0.84–2.06 times AME diameter. Chelicerae stout with large boss (Fig. 2), length 6.31–12.00 times clypeal height, pro- and retromargins of fang furrow in most specimens with 3 teeth. Sternum length 1.31–1.88 times width; labium long, with basal notch, length 1.19–1.67 times width; pedipalpal coxal endites nearly parallel (Fig. 3), length 1.94–3.00 times width, serrula teeth in single row along outer margin. Leg formula 1423 or 4123, ratio of femur I length/carapace width 1.32–2.84 in male, 0.97–1.87 in female; integument finely wrinkled, with plumose and feathery setae (sensu Lehtinen 1975) on legs and body (Figs. 6, 9, 43–44); male leg tibiae with basal crack (Griswold 1993, figs. 3, 4); trochanters with broad, shallow notch. Spination, male basic pattern, comprises: pedipalpus: femur d0-1-1-1, r0-0-0-1; leg I: femur d1-0-0, tibia v2-2-2-2, p0-1-1-0, r0-1-1-0, metatarsus v2-2-1, p1-1-1, r1-1-1; leg II: femur d1-0-0, tibia v2-2-2, p0-1-1-0, r0-1-0, metatarsus v2-2-1, p1-1-2, r0-1-0; leg III: femur: d1-0-1, tibia: v1-1-2, p1-1-0, d0-1-0, r1-1-0, metatarsus v1-1-2, p1-1-2, d0-1-0, r1-1-2; leg IV: femur: d1-0-0, tibia v1-2-2, r0-1-1-0, metatarsus: v1-1-2, p0-0-2, r0-0-2. *Raecius jocquei* has more dorsal spines on femur and tibia I and *R. scharffi* has fewer lateral spines on tibia and metatarsus I and fewer ventral spines on tibia II. Female basic spination pattern: pedipalpus: femur d1-1-1, tibia p0-1-0, tarsus p1-1, v0-1; leg I: femur: d1-0-1, tibia v2-2-2-2, metatarsus p0-0-2, v2-2-2, r0-0-2; leg II: femur: d1-0-1, patella p1, tibia p1-0-1, v1-1-2, metatarsus p1-0-2, v2-2-1, r0-0-2; leg III: femur d1-0-0, patella p1, tibia d0-1-0, p1-0-1, v1-1-2, r1-0-1, metatarsus p 0-1-1-2, v2-2-2, r1-1-2; leg IV: femur d1-0-0, tibia p1-0-0, v1-1-2, metatarsus p0-0-2, v1-1-2, r0-0-2. Femoral dorsal, patellar prolateral, and lateral spines of the tibiae and metatarsi may be fewer or more than this pattern. Calamistrum rectangular-oval, arising basally and extending for 2/3 length segment, attenuate distally (Figs. 6, 8). Trichobothrial pattern: absent from leg femora and patellae, tibiae with a dorsobasal group, few prolaterals, and a retrolateral row extending to apex, metatarsi with a dorsal, irregular row, this row restricted to apical half of IVth, tarsi with dorsobasal row that divides into 2–3 rows apically, pedipalpal tibiae with pro- and retrolateral rows, in males extending dorsad and retrolaterad of RTA, apparently absent from tarsi of most specimens, although a female of *R. jocquei* has a single dorsal trichobothrium on one pedipalpal tarsus; trichobothrial base with transversely-ridged hood (Figs. 4, 7). Tarsal organ median to basal, capsulate, orifice simple, oval to round (Figs. 5, 7). Male scopulae beneath tarsi I–IV, female scopulae beneath all tarsi and at least metatarsi I and II (Fig. 1), scopulae extend distad of tarsal apices, may obscure claws; dorsal scopulate patch on cymbium absent (Fig. 53). Preening combs absent. Superior tarsal claws pectinate, those of legs I and II with 8–12 teeth, those of legs III–IV with 3–7 teeth, inferior tarsal claws (ITC) simple, large or reduced to nubbins or absent; female pedipalpus claw pectinate, with 3–10 teeth; claw tufts absent. Male pedipalpal tibia with retroapical (RTA) and ventral (VTA) apophyses (Figs. 22, 38), dorsal apophysis (DTA) present (*R. scharffi*: Fig. 55) or absent. Pedipalpal tarsus (Figs. 22, 23) with large, triangular petiole (P) attached to alveolus; subtegulum (ST) cup-shaped, with 4–5 anelli (AN), prolateral margin with lobe that articulates with corresponding lobe on tegulum in unexpanded bulb (Fig. 23); tegulum (T) U-shaped, simple; firmly attached embolus (E) arising on prolateral side of tegulum, embolus flattened and ribbon-like, may have groove or fold along outer margin (Fig. 51); median apophysis (MA) flexibly attached; conductor (C) hyaline, originating from retroapex of T, cup or fan-shaped (Figs. 29, 45, 55); tegulum with no (*R. scharffi*), one (*R. asper*) or two (*R. jocquei*) sclerotized processes (STP); fundus in subtegulum, reservoir and ejaculatory duct simple, without loops or switchbacks, spiraling around outer margin of T. Abdomen oval, without scuta (Figs. 1–2). Respiratory system comprising two anterior book lungs and a single, small spiracle just anterior of cribellum leading into four simple tracheal tubes confined to abdomen (examined in juvenile *R. asper* from Mann's Spring). Epigynum (Fig. 41) divided by epigynal folds (EF) into median sector (MS) and lateral lobes (LL); median sector with transverse lobe (ML), variously shaped; LL tooth present or absent; vulva (Figs. 42, 58; Griswold 1993, figs. 29, 30) with copulatory ducts (CD) anteromedian, short, slender, entering spermathecal head (HS) laterally or ventrolaterally; HS small, hemispherical; base of spermatheca (BS) simple, short, fertilization

duct (FD) posterior. Cribellum wide, short, width greater than 3 times length, spinning field entire (Figs. 18–19), cribellar spigots arranged in longitudinal linear groups (Figs. 19, 21). Six spinnerets (Fig. 18), anteriors (ALS) and posterior laterals (PLS) two-segmented, posterior medians (PMS) one-segmented; ALS conical, PMS and PLS cylindrical, distal segment of PLS domed, short, less than 1/3 length basal segment. Female (examined in *R. asper* and *R. jocquei*) with ALS (Fig. 11) having two large major ampullate gland spigots (MAP) on mesal margin and oval field of more than 30 piriform gland spigots (PI); PMS (Fig. 12) with one large minor ampullate gland spigot (mAP) near anterior margin and large central nubbin, several aciniform gland spigots (AC), with 4–5 large cylindrical gland spigots (CY) with long conical bases and long slender shafts on posterior surface of spinneret extending to base; PLS (Figs. 13, 20) with 4–6 large CY on margin of AC spinning field, apparent apical pseudoflagelliform gland spigot (PsFl) present (*R. asper*; Fig. 20) or not apparent (*R. jocquei*; Fig. 13). Male (examined in *R. jocquei*; Figs. 14–17) lacking CY, other spigots reduced in number: only one MAP on ALS accompanied by a nubbin, and apical nubbin on PLS (Fig. 17). Such a PLS apical nubbin may replace the PsFl spigot in the male, suggesting that a PsFl may be present (but undistinguished) in the female of *R. jocquei*. Male epiandrous spigots absent (Fig. 44).

COMPOSITION. — Five species.

DISTRIBUTION. — Tropical Africa from Côte d'Ivoire on the west across the Congo basin to Eritrea and Tanzania in the east (Fig. 63).

KEY TO SPECIES OF *RAECIUS*

- 1 Dorsal abdominal markings uniform (Koch 1875, pl. 3, fig. 4); leg formula 4123; occurring in semiarid Eritrea *crassipes* (L. Koch)
Dorsal abdominal markings with at least a faint light longitudinal band (Fig. 1); leg formula 1423; occurring in moist equatorial Africa 2
- 2(1) Males 3
Females 5
- 3(2) Pedipalpal bulb with STP; median apophysis not produced into distal hook; DTA absent; RTA large, length greater than 0.5 times length of tibia 4
Pedipalpal bulb lacking STP, median apophysis produced into distal hook (Figs. 54–56); pedipalpal tibia with DTA; RTA small, attenuate at apex, less than 0.4 times length of tibia (Fig. 55) *scharffi* new species
- 4(3) Pedipalpal bulb having median apophysis expanded and bilobate at apex and STP curved and narrow (Fig. 47), pedipalpal tibia with RTA expanded and bilobate at apex, length greater than 0.85 times length of tibia (Fig. 46) *jocquei* new species
Pedipalpal bulb having median apophysis cup-shaped and STP broad (Fig. 40), pedipalpal tibia with RTA truncate at apex, length 0.5–0.67 times length of tibia (Fig. 29) *asper* (Thorell)
- 5(2) Epigynal median lobe concave posteriorly, length less than 1.0 times width 6
Epigynal median lobe convex posteriorly, narrow, length 1.2–1.7 times width (Figs. 31, 33, 35). *asper* (Thorell)
- 6(5) Epigynal median lobe deeply concave posteriorly, U-shaped, length 0.80–0.85 times width, lateral lobes with teeth (Fig. 48) *jocquei* new species
Epigynal median lobe weakly concave posteriorly, very broad, length less than 0.55 times width, lateral lobes without teeth (Fig. 57). *congoensis* new species

Raecius asper (Thorell, 1899)

Figures 1–3, 6, 8, 18, 20, 24–42, 63

Mnesitheus asper Thorell, 1899:18 (female type specimen from Mapanja, Cameroon, 1884–1885, Valdaud and Knutson, in RMS, examined). Simon 1903:975. Roewer 1954:1379. Bonnet 1957:2968.

Raecius asper, Lehtinen, 1967:262. Platnick 1997:682; 2002.

Mnesitheus vittatus Simon, 1907:227 (three juvenile syntypes from Moka (sic), Fernando Poo [Bioko Island, Equatorial Guinea], in MNHN, AR817, examined). Roewer 1954: 1379. Bonnet 1957: 2968. NEW SYNONYMY.

Raecius vittatus, Lehtinen 1967:262. Platnick 2002.

Mnesitheus zoropsides Strand, 1916:140 (male type specimen from Buea, Cameroon, in NHMV, examined). Roewer 1954:1379. Bonnet 1957:2968. NEW SYNONYMY.

Raecius zoropsides, Lehtinen, 1967:262. Griswold 1993:7. Platnick 1997:682; 2002. Griswold and Ubick 1999:31.

NOTES. — Males, females and juveniles have been collected in association on Bioko Island, Equatorial Guinea. Males correspond in detail to *R. zoropsides* Strand, juveniles to *R. vittatus* Simon, and females to *R. asper* Thorell. The latter name is the senior synonym. This species was discussed and illustrated in Griswold (1993:14, figs. 25–27). Data from the holotype of *Mnesitheus zoropsides* provided the male *Raecius* characters in the phylogenetic matrix. This species also provided exemplar data for *Raecius* in Griswold et al. (1999).

DIAGNOSIS. — Male with pedipalpal bulb having median apophysis cup-shaped and STP prominent and broad (Figs. 30, 37–40), pedipalpal tibia with RTA truncate at apex, 0.5–0.67 times the length of the tibia (Fig. 29). Female with epigynal median lobe convex posteriorly, narrow, length 1.2–1.7 times width (Figs. 31, 33, 35, 41).

MALE (Moca, Bioko). — Total length 10.00. Carapace, chelicerae, legs and pedipalpi yellow-brown, labium and pedipalpal coxae yellow-brown, lighter at tips, sternum, leg coxae and trochanters yellow-white; carapace with sides of caput and pars thoracica dusky and covered with dark setae, center of carapace bare and pale; caput dark at anterolateral margins above cheliceral bases; dark pigment surrounding each eye and extending between ALE and PLE; retrolateral process of pedipalpal tibia (RTA) dark brown to black; dorsum of abdomen dark gray with narrow central yellow-gray longitudinal band, simple anteriorly and scalloped and broken into spots posteriorly; sides and venter yellow-gray mottled with dark spots; spinnerets yellow-gray. Carapace 5.33 long, 3.24 wide, 1.81 high; clypeus 0.24 high, height 1.04 times AME diameter; ocular area 0.57 long, 1.47 wide, OAL 1.30 times OQL; ratio of eyes AME:ALE:PME:PLE, 1.14:1.07:1.14:1.00, diameter of PME 0.23; AME interdistance 0.5 times AME diameter, AME-ALE 0.44 times AME; PME interdistance 0.56 times PME, PME-PLE 1.44 times PME; ALE-PLE 0.57 times PLE. Chelicerae 0.98 long. Sternum 2.75 long, 1.69 wide; labium 1.20 long, 0.78 wide; pedipalpal coxae 1.73 long, 0.78 wide. Femur I length 1.49 times carapace width. Spination: basic pattern. ITC I and II absent, III and IV reduced to nubbins. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 4.83 + 2.05 + 4.83 + 4.15 + 2.18 = [18.04]; II: 3.85 + 1.80 + 3.37 + 3.02 + 2.10 = [14.14]; III: 3.07 + 1.46 + 1.80 + 2.44 + 1.61 = [10.38]; IV: 4.39 + 1.80 + 3.66 + 3.71 + 2.00 = [15.56]; pedipalpus: 2.10 + 0.93 + 0.88 + [absent] + 1.80 = [5.71]. Pedipalpal tibia with RTA curved, widened at truncate, serrated apex, length 0.5–0.67 times that of tibia, VTA cylindrical, tapering to apex, pro- and retroventral margin of tibia at tibia-tarsus joint produced into small processes. Pedipalpal bulb with median apophysis cup-shaped, STP prominent and broad, narrowed apically, embolus short and ribbon-like, and conductor small and narrow (Figs. 28–30, 37–40; Griswold 1993, figs. 25–27).

Variation (N = 5). Total length 8.71–12.14; ratios of carapace length/width 1.59–1.65, height/width 0.44–0.56, ratios of PER/OQP 2.37–2.90, PER/OAL 2.59–3.10, OQP/OQA 1.06–1.21, ratios of clypeal height/diameter AME 0.88–1.50, cheliceral length/clypeal height 7.68–10.73, ratio of length femur I/carapace width 1.34–1.40. Markings of abdomen range from a faint anterior longitudinal light mark and uniformly pale sides to a bold longitudinal light mark breaking into chevrons posteriorly with sides mottled. ITC I and II may be reduced to nubbins or absent.

FEMALE (Mann's Spring, Cameroon). — Total length 12.27. Carapace red-brown, darkest anteriorly and on sides of pars cephalica, palest around thoracic fovea, sides covered sparsely with dark scales; chelicerae dark brown except boss red; labium and pedipalpal coxae red-brown, lighter at

bases and tips; sternum and leg coxae yellow-brown, legs I and II shading to dusky red-brown from basal third of tibiae to apex of tarsi; abdomen marked as in male (Figs. 1–3). Carapace 6.29 long, 3.90 wide, 2.19 high; clypeus 0.35 high, height 1.75 times AME diameter; ocular area 0.62 long, 1.88 wide, OAL 1.32 times OQL; ratio of eyes AME:ALE:PME:PLE, 1.00:1.28:1.21:1.07, diameter of PME 0.24; AME-AME interdistance 0.86 times AME diameter, AME-ALE 1.07 times AME; PME-PME interdistance 0.70 times PME, PME-PLE 1.82 times PME; ALE-PLE 0.93 times PLE. Chelicerae 2.94 long. Sternum 2.82 long, 1.92 wide; labium 1.41 long, 0.98 wide; pedipalpal coxae 2.16 long, 0.90 wide. Femur I length 1.05 times carapace width. Spination: basic pattern. ITC I and II reduced to nubbins, III small, IV large. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: $4.10 + 2.05 + 3.51 + 2.88 + 2.20 = [14.74]$; II: $3.80 + 1.85 + 2.73 + 2.29 + 1.95 = [12.62]$; III: $2.93 + 1.61 + 1.46 + 1.85 + 1.32 = [9.17]$; IV: $4.00 + 2.00 + 2.93 + 2.88 + 1.56 = [13.37]$; pedipalpus: $2.10 + 1.07 + 1.12 + [\text{absent}] + 1.61 = [5.90]$. Epigynum with median lobe convex posteriorly, narrow, length 1.3 times width, lateral lobes contiguous posteriorly, without teeth (Fig. 31). Vulva with spermathecal head oval (Fig. 32).

Variation (N = 11). Total length 10.85–14.42; ratios of carapace length/width 1.47–1.53, height/width 0.53–0.73, ratios of PER/OQP 2.56–3.64, PER/OAL 2.89–4.87, OQP/OQA 1.08–1.36, ratios of clypeal height/diameter AME 1.48–2.06, cheliceral length/clypeal height 7.32–9.41, ratio of length femur I/carapace width 0.97–1.14. Markings of abdomen range from a faint anterior longitudinal light mark and uniform sides to a bold longitudinal light mark breaking into chevrons posteriorly with sides mottled (Figs. 1, 2). Patellar spines present or absent. Scopulae restricted to tarsus and metatarsus I and tarsus II or extending onto tibia I and metatarsus II. Epigyna with lateral lobe teeth present (Figs. 33, 35) or absent (Fig. 31), median lobe length 1.2–1.7 times width, spermathecal head round (Fig. 34) to oval (Figs. 32, 36).

DISTRIBUTION. — Southwestern Cameroon and Bioko Island in the Gulf of Guinea (Fig. 63).

MATERIAL EXAMINED. — **CAMEROON:** Southwest: Fako Division: Mt. Cameroon: mist forest on south side, elev. 1425 m, 4°06'28"N, 9°07'10"E, 26–28 January 1992, C. Griswold, J. Coddington, G. Hormiga, S. Larcher (3♀ CAS, 2♀ USNM); grassland near Mann's Spring, elev. 2050 m, 4°08'N, 9°07'E, 21–25 January 1992, C. Griswold, J. Coddington, G. Hormiga, S. Larcher (17♀ CAS, 54♀ USNM); Buea, type of *Mnesitheus zoropsides* Strand (1♂ NHMV); Mapanja, 1884–1885, Knutson and Valda, type of *Mnesitheus asper* Thorell (1♀ RMS). Meme Division: Mt. Kupé above Nyassosso, forest, elev. 800–1200 m, 4°50'N, 9°41'E, 16–19 February 1992, C. Griswold, N. Scharff, C. Wanzie, S. Larcher, P. Masongo (1♀ CAS). Northwest: Bali, Bafuchu Mbu, Shum Laka, elev. 1600 m, pitfall, December 1991–February 1992, H. Doutrelepon (1♀ MRAC). **EQUATORIAL GUINEA:** Bioko: Moca, 3°22'0"N, 8°39'57"E, elev. ca. 1400 m, 6–10 October 1998, K. Dabney and D. Ubick (3♂1♀ CAS), 1500 m, "ex: silk-lined burrow on tree fern," 3–10 October 1998, D. Ubick (1♂ CAS); Pico Basilé, 3°37'38"N, 8°48'15"E, elev. ca. 1750 m, in rotting logs, 27–29 September 1998, K. Dabney and D. Ubick (1♂2♀ CAS); Moka (sic), types of *Mnesitheus vittatus* Simon (3 juveniles, MNHN AR817).

Raecius congoensis, new species

Figures 7, 57, 58, 63

TYPE. — Female holotype from Congo, Lulimbi, embouchure de la riv. Ishasha dans le lac Edward (Sud-Est) baie de Kyangiro, "dans le sol prélève," collected July–August 1976, M. Lejeune, deposited in MRAC (168.827). Paratype female, same data and deposition except "terreau sous litière, galerie forestière" (MRAC168.862).

ETYMOLOGY. — Refers to occurrence in Congo.

NOTE. — This species was discussed and illustrated in Griswold (1993:14, figs. 28–30). Data from the species provided the female *Raecius* characters in the phylogenetic matrix. This species also provided exemplar data for *Raecius* in Griswold et al. (1999).

DIAGNOSIS. — Female with epigynal median lobe weakly concave posteriorly, very broad, length less than 0.55 times width, lateral lobes without teeth (Fig. 57). Male unknown.

MALE. — Unknown.

FEMALE (Holotype). — Total length 15.73. Carapace orange-brown dorsally, shading to dusky red-brown laterally and on pars cephalica; sides sparsely covered with dark setae that overlay black reticulate patterns that radiate from thoracic fovea; thoracic fovea dusky; each eye narrowly surrounded by black pigment; chelicerae dark red-brown except boss orange; labium and pedipalpal coxae orange-brown with dusky maculations; sternum dusky gray-brown; leg coxae yellow-brown with dusky markings, these most pronounced on I and II, reticulate basally becoming solid distally; legs and pedipalpi yellow-brown, legs I and II with dark gray forming longitudinal lateral and dorsal mottling on femora and tibiae; abdomen yellow-gray, faded, markings appear to have comprised narrow dorsal longitudinal light band and light and dark spots laterally. Carapace 7.52 long, 4.38 wide, 2.95 high; clypeus 0.39 high, height 2.05 times AME diameter; ocular area 0.64 long, 2.05 wide, OAL 1.36 times OQL; ratio of eyes AME:ALE:PME:PLE, 1.00:1.18:1.04:1.33, diameter of PME 0.20; AME-AME interdistance 1.11 times AME diameter, AME-ALE 1.26 times AME; PME-PME interdistance 1.57 times PME, PME-PLE 2.71 times PME; ALE-PLE equals PLE. Chelicerae 3.10 long. Sternum 3.84 long, 2.04 wide; labium 1.53 long, 1.06 wide; pedipalpal coxae 2.39 long, 0.98 wide. Femur I length 1.10 times carapace width. Spination: typical. ITC I and II absent, III very small, IV small. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: $4.83 + 2.49 + 3.61 + 2.83 + 2.34 = [16.10]$; II: $4.05 + 2.20 + 2.78 + 2.44 + 2.00 = [13.47]$; III: $3.27 + 1.80 + 1.51 + 2.15 + 1.56 = [10.29]$; IV: $4.59 + 2.29 + 3.32 + 3.41 + 2.00 = [15.61]$; pedipalpus: $2.39 + 1.22 + 1.15 + [\text{absent}] + 2.07 = [6.83]$. Epigynum with median lobe weakly concave posteriorly, very broad, length less than 0.55 times width, lateral lobes contiguous posteriorly, without teeth (Fig. 57; Griswold 1993, fig. 28). Vulva with copulatory duct broad with lateral diverticulum, spermathecal head narrow with a few pores, spermathecal base short, extending mesad to fertilization duct (Fig. 58; Griswold 1993, figs. 29, 30).

Variation (N = 2). Total length 12.53–15.73; ratios of carapace length/width 1.51–1.72, height/width 0.69–0.71, PER/OAL 3.22–3.45, OQP/OQA 1.10–1.29; ratios of clypeal height/diameter AME 1.86–2.05, cheliceral length/clypeal height 7.95–8.33, ratio of length femur I/carapace width 1.09–1.10; number of ventroapical spines on metatarsi I and II ranging from 2 to 5; median and proximal dorsal femoral spines present or absent; scopulae weak to strong beneath metatarsus II, extending from $\frac{1}{2}$ to entire length of segment.

DISTRIBUTION. — Southeastern Congo basin (Fig. 63).

MATERIAL EXAMINED. — Only the holotype and paratype.

Raecius crassipes (L. Koch, 1875)

Figure 63

Amaurobius crassipes L. Koch, 1875:32, pl. 3, f. 4 (holotype juvenile from “Ethiopia” “in dem trocknen Strombette des Anseba” [from the dry streambed of the Anseba River, in what is today northern Eritrea], in BMNH, examined.)

Raecius crassipes, Simon, 1892:230. Roewer 1954:1283. Bonnet 1958:3847. Platnick 2002.

NOTE. — The juvenile female type specimen is faded, shriveled and disarticulated, but all parts are present. The relatively long carapace and entire cribellum with linear bunches of cribellar spigots leave no doubt that it is congeneric with the other species here placed in *Raecius*. Because the speci-

men is immature, diagnosis is difficult, but because the type locality is geographically distant and ecologically different (i.e., arid) from those of other *Raecius* species, I consider *R. crassipes* distinct.

DIAGNOSIS. — The juvenile specimen lacks diagnostic genitalia and is faded. Koch's figure (1875, pl. 3, fig. 4) depicts a spider with dark carapace and pale pars cephalica and uniformly pale abdomen. Other *Raecius* species have dark abdomens with at least a faint longitudinal median band. The 4123 leg formula differs from the 1423 of other *Raecius*.

JUVENILE TYPE FEMALE. — Total length approximately 8.0 mm. Specimen faded, Koch's figure (1875, pl. 3, fig. 4) depicts a dark carapace and pale pars cephalica and uniformly pale abdomen. Carapace 4.80 long, 3.15 wide, 1.55 high; clypeus 0.25 high, height 2.27 times AME diameter; ocular area 0.45 long, 1.35 wide, OAL 1.28 times OQL; ratio of eyes AME:ALE:PME:PLE, 1.00:1.72:1.54:1.72, diameter of PME 0.17; AME-AME interdistance 1.18 times AME diameter, AME-ALE 1.45 times AME; PME-PME interdistance 0.68 times PME, PME-PLE 1.88 times PME; ALE-PLE 0.26 times PLE. Chelicerae 2.35 long. Sternum 2.25 long, 1.40 wide, apex forming blunt angle; labium 1.00 long, 0.80 wide; pedipalpal coxae 1.70 long, 0.75 wide. Femur I length 1.06 times carapace width. Spination typical for female *Raecius* except femora lacking spines. Scopulae: dense, extending below apical 1/2 of metatarsi I and II, restricted to tarsi III and IV. ITC present on all legs, ITC III smallest. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: $3.35 + 1.70 + 2.50 + 1.70 + 1.65 = [10.90]$; II: $2.85 + 1.50 + 2.00 + 1.60 + 1.60 = [9.55]$; III: $2.20 + 1.40 + 1.25 + 1.65 + 1.25 = [7.75]$; IV: $3.25 + 1.65 + 2.65 + 2.50 + 1.60 = [11.65]$; pedipalpus: $1.50 + 0.85 + 0.75 + [\text{absent}] + 1.40 = [4.50]$.

DISTRIBUTION. — Known only from the type locality, in an arid region of northern Eritrea (Fig. 63).

MATERIAL EXAMINED. — Only the type.

Raecius jocquei, new species

Figures 10–17, 19, 21–23, 43–53, 63

TYPE. — Male holotype from Côte d'Ivoire, Appouesso, forêt classée de la Bossematie, pitfall traps, 31 October 1994, R. Jocqué and N. Seabé, deposited in MRAC (202.373). Paratypes, same locality, 18♂4♀ MRAC, 1♂1♀ CAS.

ETYMOLOGY. — Named in honor of Rudy Jocqué, who collected these specimens as well as many other rare and interesting African Arachnida.

NOTE. — This species provided partial exemplar data for *Raecius* in Griswold et al. (1999).

DIAGNOSIS. — Male with pedipalpal bulb (Figs. 45–47, 50–53) having median apophysis expanded and bilobate at apex and STP prominent, curved and narrow, pedipalpal tibia with RTA large, expanded and bilobate at apex, greater than 0.85 times the length of the tibia. Female with epigynal median lobe deeply concave posteriorly, U-shaped, length 0.80–0.85 times width (Fig. 48).

MALE (Holotype). — Total length 6.76. Spider yellow-gray, unmarked except carapace dusky laterally overlain sparsely with dark setae, leaving median pale band, broad on pars cephalica and narrow on pars thoracica; each eye surrounded with black pigment; dorsal process of pedipalpal tibia dark brown; dorsum of cymbium dusky; abdomen dark gray dorsally except for narrow median pale band, sides mottled. Carapace 4.00 long, 2.63 wide, 1.27 high; clypeus 0.18 high, height 1.13 times AME diameter; ocular area 0.40 long, 0.97 wide, OAL 1.21 times OQL; ratio of eyes AME:ALE:PME:PLE, 1.10:1.30:1.20:1.00, diameter of PME 0.17; AME interdistance 0.45 times AME diameter, AME-ALE 0.27 times AME; PME interdistance 0.33 times PME, PME-PLE 1.08 times PME; ALE-PLE 0.50 times PLE. Chelicerae 1.39 long. Sternum 1.98 long, 1.35 wide; labium 0.73 long, 0.55 wide; pedipalpal coxae 1.25 long, 0.42 wide. Femur I length 1.33 times carapace width. Spination: basic pattern except femora I–IV d1-1-1, tibia I d1-1-1, metatarsi III and IV p1-1-2. ITC I small, slender, II small, stout, III and IV large. Leg measurements (Femur + Patella + Tibia +

Metatarsus + Tarsus = [Total]): I: $3.49 + 1.49 + 3.76 + 3.45 + 1.96 = [14.15]$; II: $2.86 + 1.37 + 2.59 + 2.59 + 1.73 = [11.14]$; III: $2.31 + 1.14 + 1.49 + 2.08 + 1.43 = [8.45]$; IV: $3.29 + 1.45 + 2.94 + 3.10 + 1.73 = [12.51]$; pedipalpus: $1.49 + 0.71 + 0.73 + [\text{absent}] + 1.14 = [4.07]$. Pedipalpus (Figs. 45–47, 50–53) with tibia with RTA large, expanded and bilobate at apex, length greater than 0.85 times that of tibia, VTA conical, broad and blunt, pro- and retroventral margins of tibia at tibia-tarsus joint produced into small processes; bulb with median apophysis expanded and bilobate at apex, with 2 STP, one (STP1) prominent, curved and narrow, extending nearly to apex of bulb, a smaller broad, curved process (STP2) arising behind STP1, embolus slender, ribbon-like, conductor short.

Variation (N = 5). Total length 5.36–6.76; ratios of carapace length/width 1.49–1.62, height/width 0.38–0.48, ratios of PER/OQP 2.39–2.65, PER/OAL 2.34–2.53, OQP/OQA 1.07–1.25, ratios of clypeal height/diameter AME 0.84–1.78, cheliceral length/clypeal height 7.31–8.36, ratio of length femur I/carapace width 1.32–2.84. Markings may be bold to faint. Retrodorsal spines on femora I–III present or absent.

FEMALE (Paratype). — Total length 9.23. Carapace red-brown, sides dusky with black reticulate markings, these markings conspicuous on sides of pars cephalica and behind posterior eyes; chelicerae red-brown with longitudinal black striae, boss orange; labium and pedipalpal coxae orange-brown, paler at bases and tips; sternum dusky yellow-gray; leg coxae gray except reticulated with yellow-gray basally; legs and pedipalpi red-brown, leg femora dusky laterally; abdomen dark gray on dorsum and sides except for narrow central longitudinal white band, venter and spinnerets pale yellow-gray. Carapace 5.05 long, 2.95 wide, 1.71 high; clypeus 0.31 high, height 1.72 times AME diameter; ocular area 0.40 long, 1.40 wide, OAL 1.21 times OQL; ratio of eyes AME:ALE:PME:PLE, 1.00:1.07:1.00:1.15, diameter of PME 0.18; AME-AME interdistance 0.72 times AME diameter, AME-ALE 0.77 times AME; PME-PME interdistance 0.54 times PME, PME-PLE 1.69 times PME; ALE-PLE 0.33 times PLE. Chelicerae 1.98 long, Sternum 2.36 long, 1.62 wide; labium 1.03 long, 0.77 wide; pedipalpal coxae 1.64 long, 0.61 wide. Femur I length 1.18 times carapace width. Spination: typical. ITC I small, II–IV large. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: $3.49 + 1.65 + 2.78 + 2.39 + 1.92 = [12.23]$; II: $3.14 + 1.61 + 2.31 + 2.06 + 1.59 = [10.71]$; III: $2.43 + 1.29 + 1.29 + 1.84 + 1.14 = [7.99]$; IV: $3.45 + 1.61 + 2.75 + 2.59 + 1.37 = [11.77]$; pedipalpus: $1.65 + 0.82 + 0.82 + [\text{absent}] + 1.37 = [4.66]$. Epigynum with median lobe deeply concave posteriorly, U-shaped, lateral lobes separate posteriorly, with mesad-extending teeth near level of anterior margin of median lobe (Fig. 48). Vulva with copulatory duct narrow, simple, spermathecal head narrow with several pores, spermathecal base very short, extending basad to fertilization duct (Fig. 49).

Variation (N = 4). Total length 4.78–9.23; ratios of carapace length/width 1.59–1.77, height/width 0.47–0.64, ratios of PER/OQP 2.51–3.13, PER/OAL 3.09–3.50, OQP/OQA 0.93–1.17, ratios of clypeal height/diameter AME 1.58–1.72, cheliceral length/clypeal height 6.31–7.67, ratio of length femur I/carapace width 1.08–1.87. Markings faint to bold. Epigynal teeth small and limited to LL or extending mesad over margins of ML, ML length 0.80–0.85 times width.

DISTRIBUTION. — Côte d'Ivoire (Fig. 63).

MATERIAL EXAMINED. — **CÔTE D'IVOIRE:** Appouesso, forêt classée de la Bossematie, pit-fall traps, R. Jocqué and N. Séabé, 3 May 1994 (8♂1♀ paratypes MRAC), 18 May 1994 (paratypes: 4♂2♀ MRAC, 1♂1♀ CAS), 31 October 1994 (2♂ paratypes, 1♂ holotype MRAC), 1 December 1994 (1♂ paratype MRAC), 18 March 1994 (1♂ paratype MRAC); Abengourou, forêt classée de la Bossematie, primary forest, piège, 4 March and 18 May 1994, N. Séabé (2♂ MRAC).

Raecius scharffi, new species

Figures 4–5, 9, 54–56, 59–63

TYPES. — Male holotype from pitfall traps at 750 m elevation in lowland rain forest in Uzungwa Scarp Forest Reserve above Chita Village, Iringa Region, Tanzania, collected on 25–29 October 1984 by Nikolaj Scharff, deposited in ZMUC. Paratype males: two from Kambai Forest Reserve and two from Marimba Forest Reserve, Tanzania, one from Marimba in CAS, and remainder in ZMUC.

ETYMOLOGY. — Named in honor of Nikolaj Scharff, who collected these specimens as well as many other rare and interesting African Arachnida.

DIAGNOSIS. — Male with pedipalpal bulb having median apophysis produced into distal hook and STP reduced, pedipalpal tibia with DTA, RTA small, attenuate at apex, less than 0.4 times the length of the tibia (Figs. 54–56, 59–62). Female unknown.

MALE (Holotype). — Total length 7.33. Spider pale yellow-gray, unmarked except dark brown at lateral margins of carapace above chelicerae and apices of chelicerae, carapace sparsely covered with dark setae, these becoming densest laterally; abdomen gray-brown on dorsum and sides, with faint anteromedian light band, venter and spinnerets yellow-white. Carapace 4.09 long, 2.76 wide, 1.53 high; clypeus 0.18 high, height 1.29 times AME diameter; ocular area 0.31 long, 1.06 wide, OAL 1.11 times OQL; ratio of eyes AME:ALE:PME:PLE, 1.00:1.11:1.11:1.11, diameter of PME 0.16; AME interdistance 0.50 times AME diameter, AME-ALE 0.70 times AME; PME interdistance 0.64 times PME, PME-PLE 1.36 times PME; ALE-PLE 0.27 times PLE. Chelicerae 1.76 long. Sternum 1.96 long, 1.33 wide; labium 0.86 long, 0.55 wide; pedipalpal coxae 1.33 long, 0.47 wide. Femur I length 1.71 times carapace width. Spination: basic pattern except pedipalpal patella has p0-1-0, tibia and metatarsus I lack retrolateral spines, tibia II v1-1-2, metatarsus II p0-1-2, metatarsus IV v2-2-1. ITC I and II very small, slender, III and IV small. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: $4.71 + 1.61 + 4.77 + 3.94 + 2.65 = [17.68]$; II: $3.87 + 1.42 + 3.42 + 3.10 + 2.06 = [13.87]$; III: $3.23 + 1.23 + 2.13 + 2.65 + 1.55 = [10.79]$; IV: $4.52 + 1.49 + \text{missing} + \text{missing} + \text{missing} = [\text{not calculated}]$; pedipalpus: $1.68 + 0.71 + 0.58 + [\text{absent}] + 1.29 = [4.26]$. Pedipalpus (Figs. 54–56, 59–62) with tibia with a small, conical DTA, RTA short, curved, bluntly pointed, length less than 0.4 times that of tibia, VTA small and low, and retroventral margin of tibia at tibia-tarsus joint produced into small process; bulb with median apophysis produced into distal hook, STP reduced, represented only by a membranous swelling, embolus short, and conductor large.

Variation (N = 5). Total length 6.67–8.40; ratios of carapace length/width 1.48–1.90, height/width 0.52–0.74, ratios of PER/OQP 2.46–2.92, PER/OAL 3.34–3.71, OQP/OQA 1.02–1.27, ratios of clypeal height/diameter AME 1.13–1.29, cheliceral length/clypeal height 9.78–12.00, ratio of length femur I/carapace width 1.65–2.17, leg formulae of paratype males 1423. Paratype males from Marimba and Kambai have the abdomen slightly darker than the type: yellow-gray dorsally with anteromedian light longitudinal band and faint transverse gray bands posteriorly. Spination: distodorsal spines on femora III and IV and metatarsus IV present or absent. DTA of pedipalpal tibia small and conical (holotype) or long and digitate (paratypes).

FEMALE. — Unknown.

DISTRIBUTION. — Eastern Arc mountains of Tanzania (Fig. 63).

MATERIAL EXAMINED. — **TANZANIA: Iringa Region:** Uzungwa Scarp Forest Reserve above Chita Village, elev. 750 m, pitfall traps in lowland Rain Forest, 25–29 October 1984, N. Scharff (1 holotype ♂ ZMUC). **Tanga Region:** Muheza District, Kambai Forest Reserve, 4°59'S, 38°41'E, pitfall traps, Frontier Tanzania Expedition (2 paratype ♂ ZMUC), Marimba Forest Reserve, 5°01'S, 38°41'E, pitfall traps, Frontier Tanzania Expedition (2 paratype ♂, 1 ZMUC and 1 CAS); East Usambara Mountains, 12 km SE Amani, Kihuhwi-Zigi Forest Reserve, 5°6.3'S, 38°40.6'E, 400–450 m elev., 2–4 November 1995, C. Griswold (1 juvenile, CAS).

EXCLUDED SPECIES

Raecius aculeatus Dahl, 1901

Raecius aculeatus Dahl, 1901a:188 (holotype juvenile from between Knako and Kimpoko, Congo, labeled *Raecius spinosus*, in ZMB, examined). Roewer 1954:1283. Bonnet 1958:3846. Platnick 2002.
Raecius spinosus Blumenthal, 1935:709.

NOTE. — No specimen has been located labeled as *Raecius aculeatus* but there is a specimen in the Zoologisches Institut der Humboldt Universität, Berlin, labeled “*Raecius spinosus* F. Dahl, Kimpoko, Büttner, ZMB25278.” Blumenthal (1935:709) referred to this specimen of *Raecius spinosus* and Bonnet (1958:3846) noted that Blumenthal’s work refers to the specimen described by Dahl as *R. aculeatus*. The specimen is a juvenile just prior to molting (no mature structures are visible through the cuticle) and is disarticulated. Part was formerly dry and on a pin, but has been returned to alcohol and other parts are slide mounted. The parts in alcohol include an intact carapace, left legs I–IV and a partial, shriveled abdomen. The slide-mounted parts comprise the chelicerae, labium and pedipalpi, right legs and spinning organs. The calamistrum is oval, cribellar spigots are in linear groups and the eyes are in two, nearly straight rows, suggesting placement in Zorocratidae. The carapace is long and narrow (length 1.8 times width) suggesting *Raecius*, but the cribellum is divided (not entire) and feathery hairs are lacking. Because this specimen does not share these synapomorphies with *Raecius*, I suggest that it should be excluded from *Raecius* and be placed *incertae sedis* in Zorocratidae.

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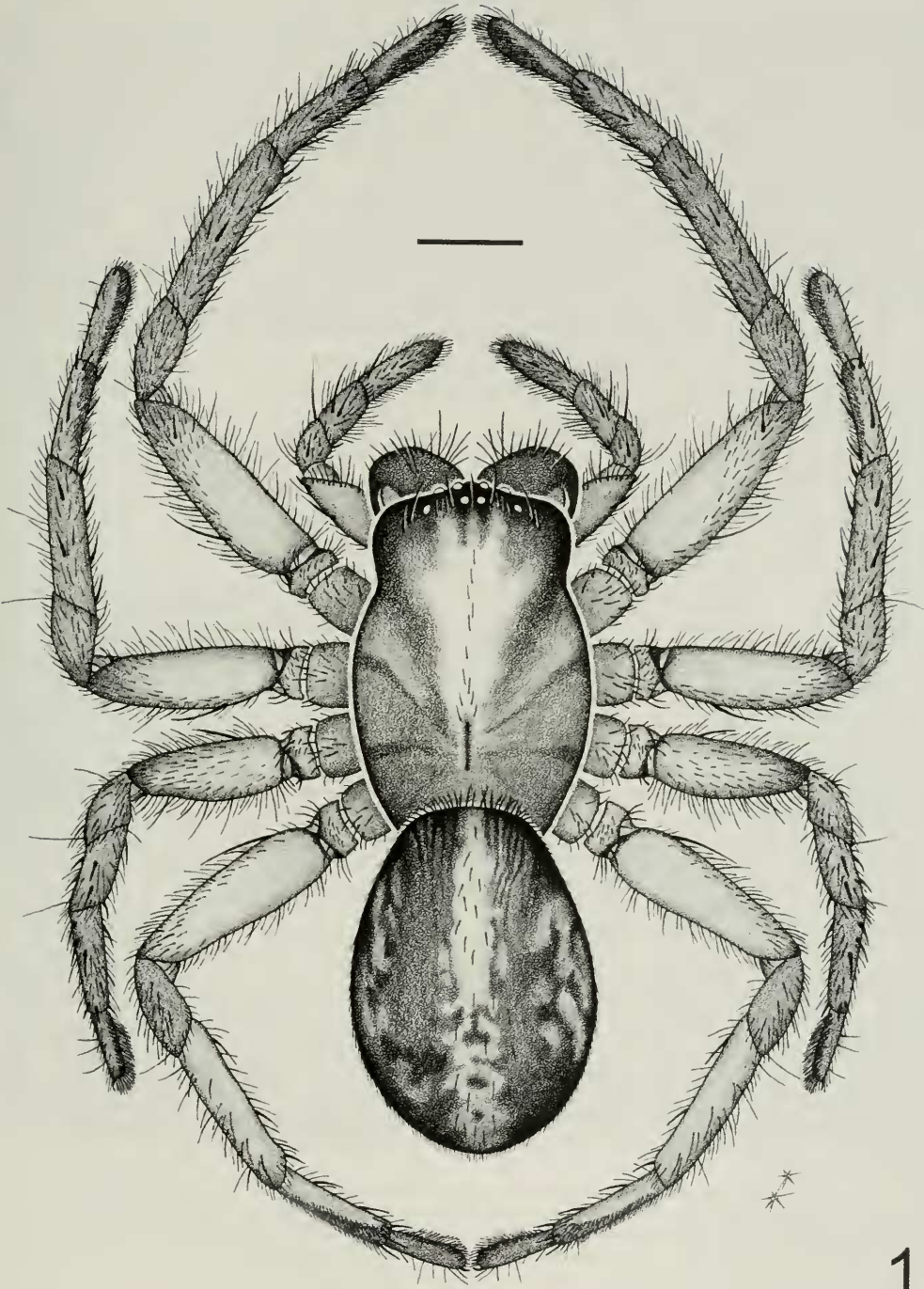
Illustrations are by Jenny Speckels (JS) or Virginia Kirsch (GK) and are attributed in the figure captions. Gustavo Hormiga kindly supplied photos of the living spiders. Assistance with manuscript preparation was provided by Joel Ledford, Heather Tennison, and Darrell Ubick. A draft of the manuscript was read and criticized by Diana Silva, Darrell Ubick, and two anonymous reviewers.

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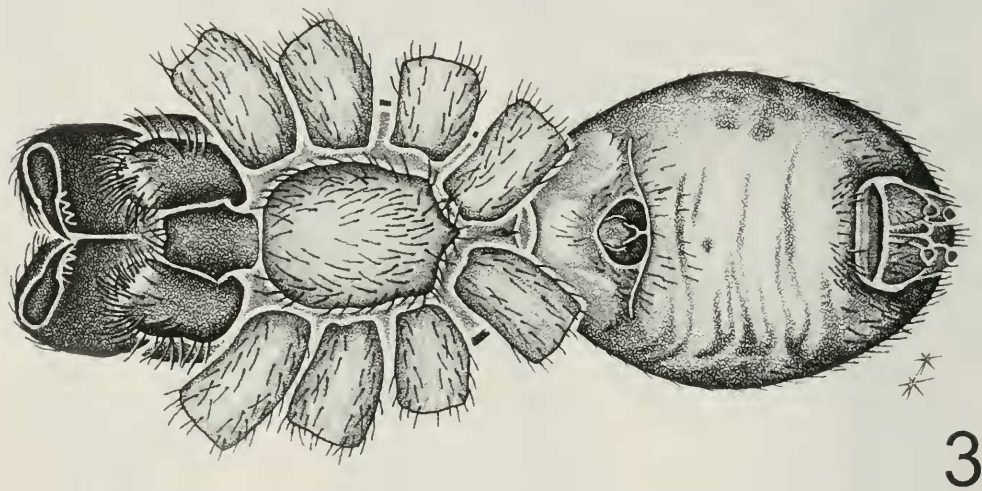
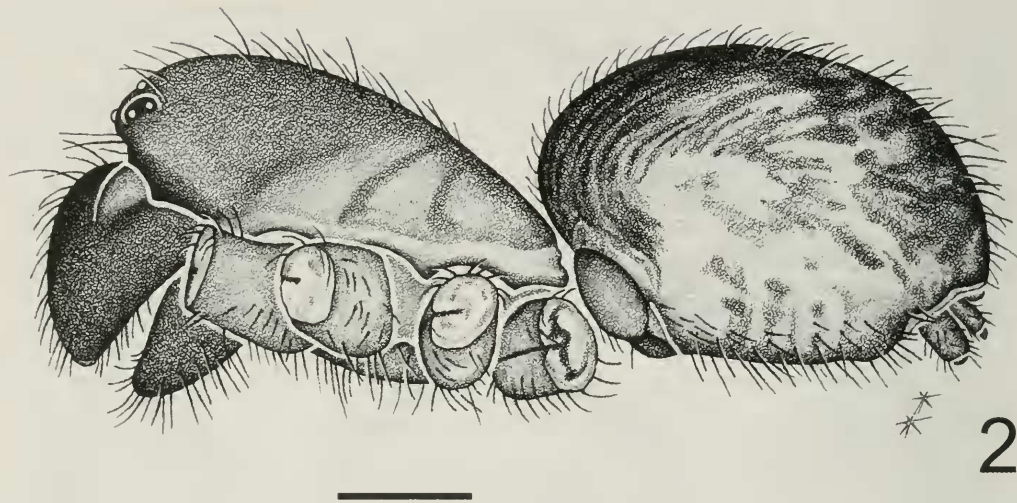
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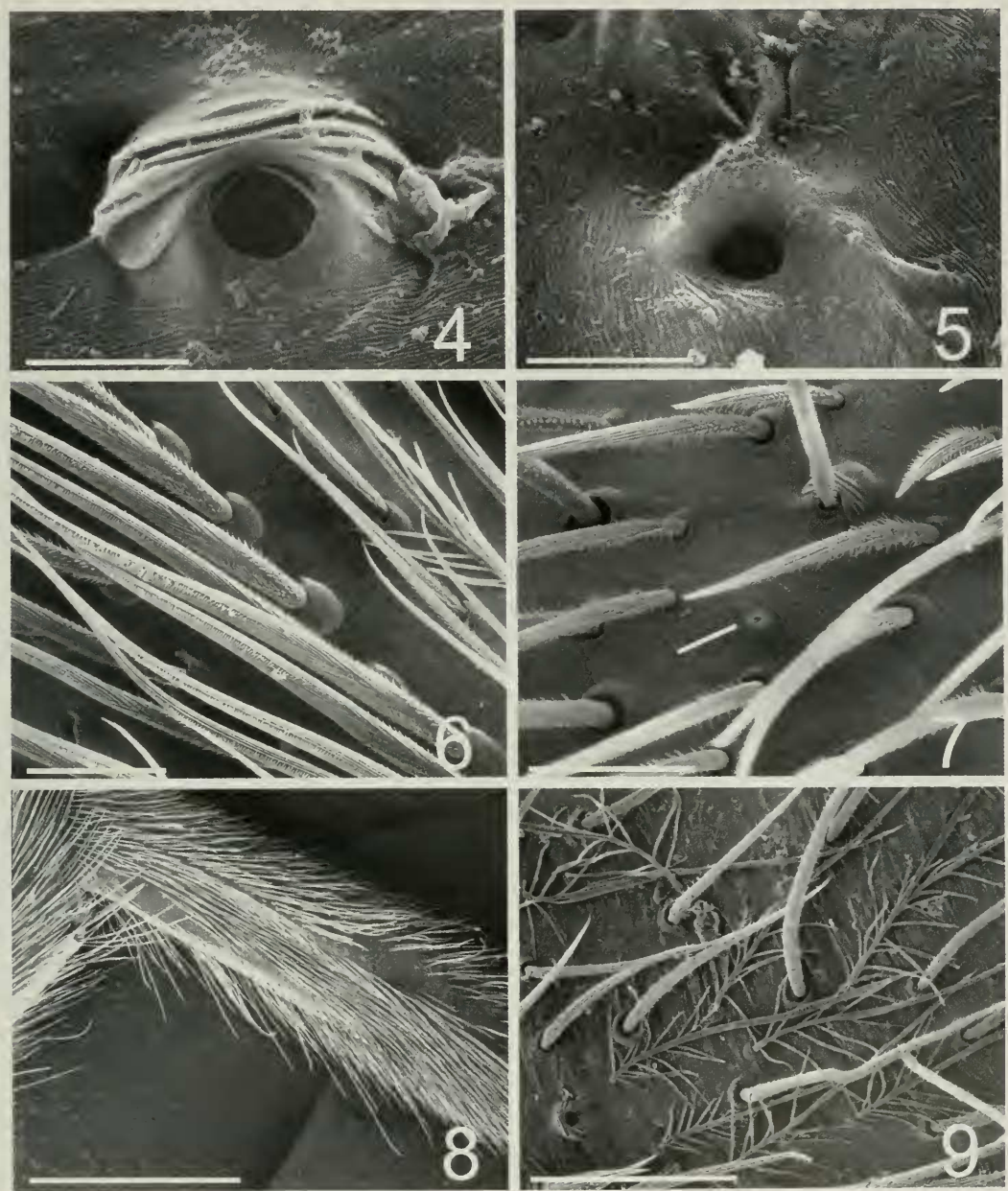


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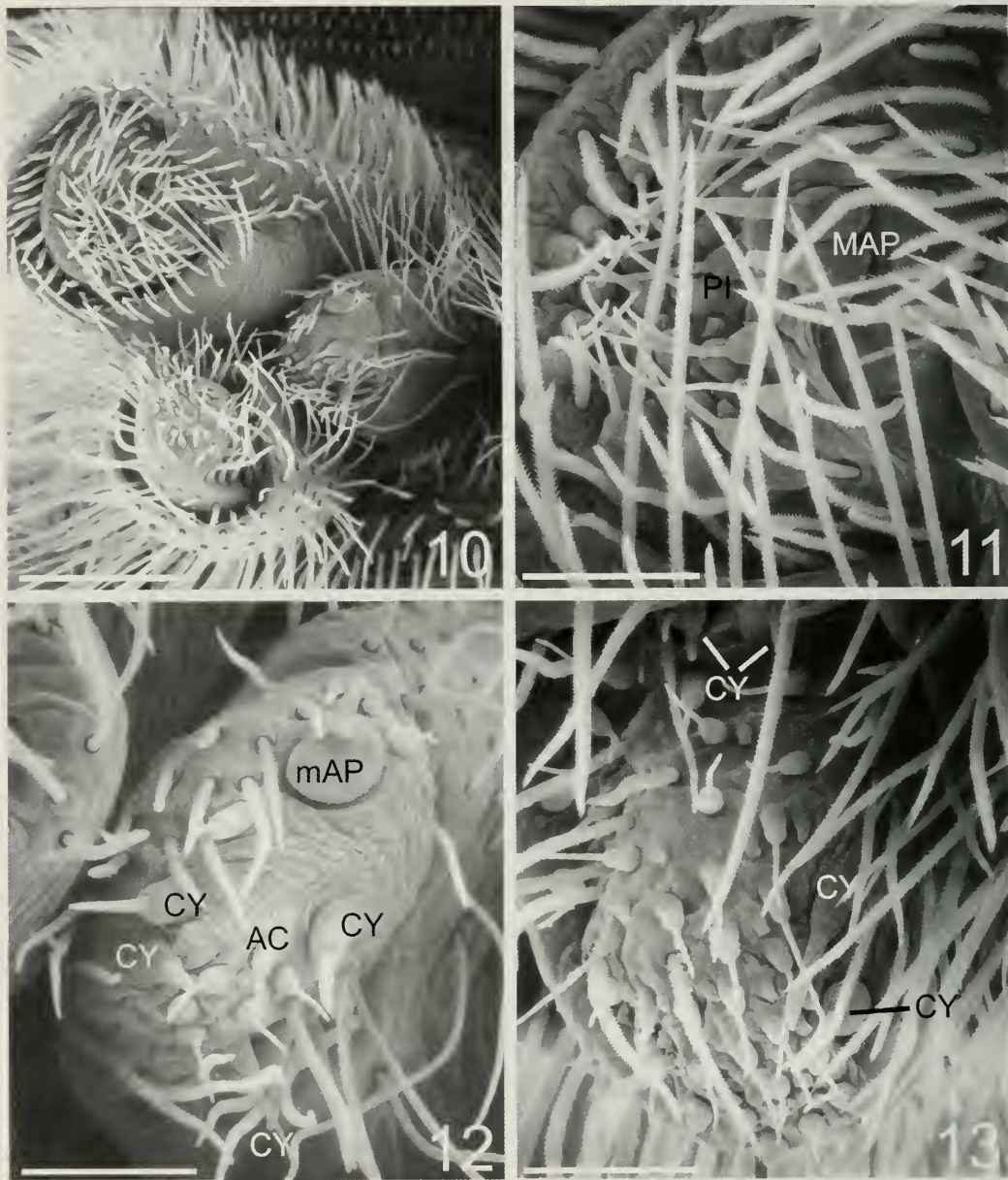
FIGURE 1. *Raecius asper*, female from Mann's Spring, habitus, dorsal. Illustration by JS. Scale bar = 1.0 mm.



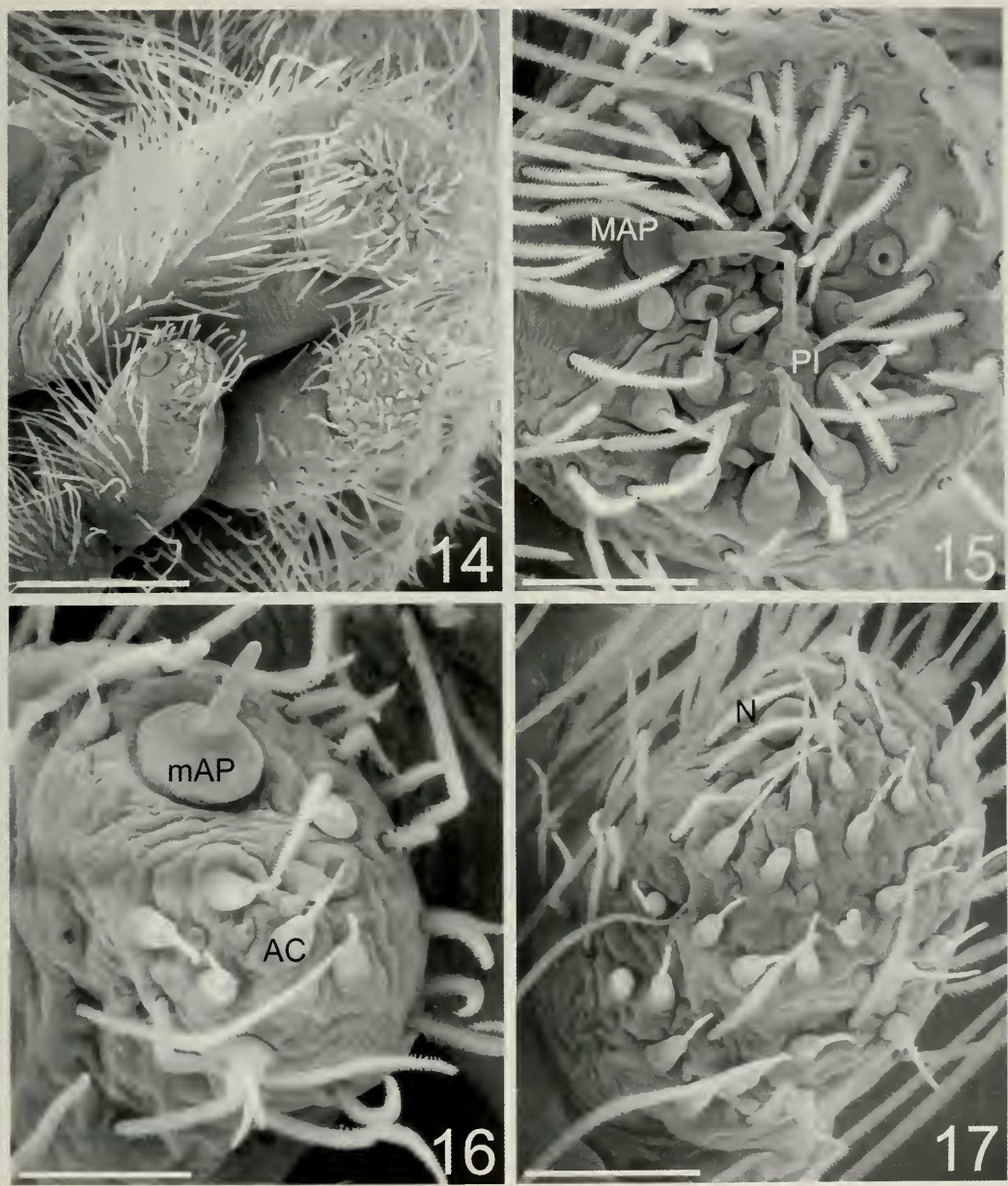
FIGURES 2-3. *Raecius asper*, female from Mann's Spring. 2. Lateral. 3. Ventral. Illustrations by JS. Scale bar = 1.0 mm.



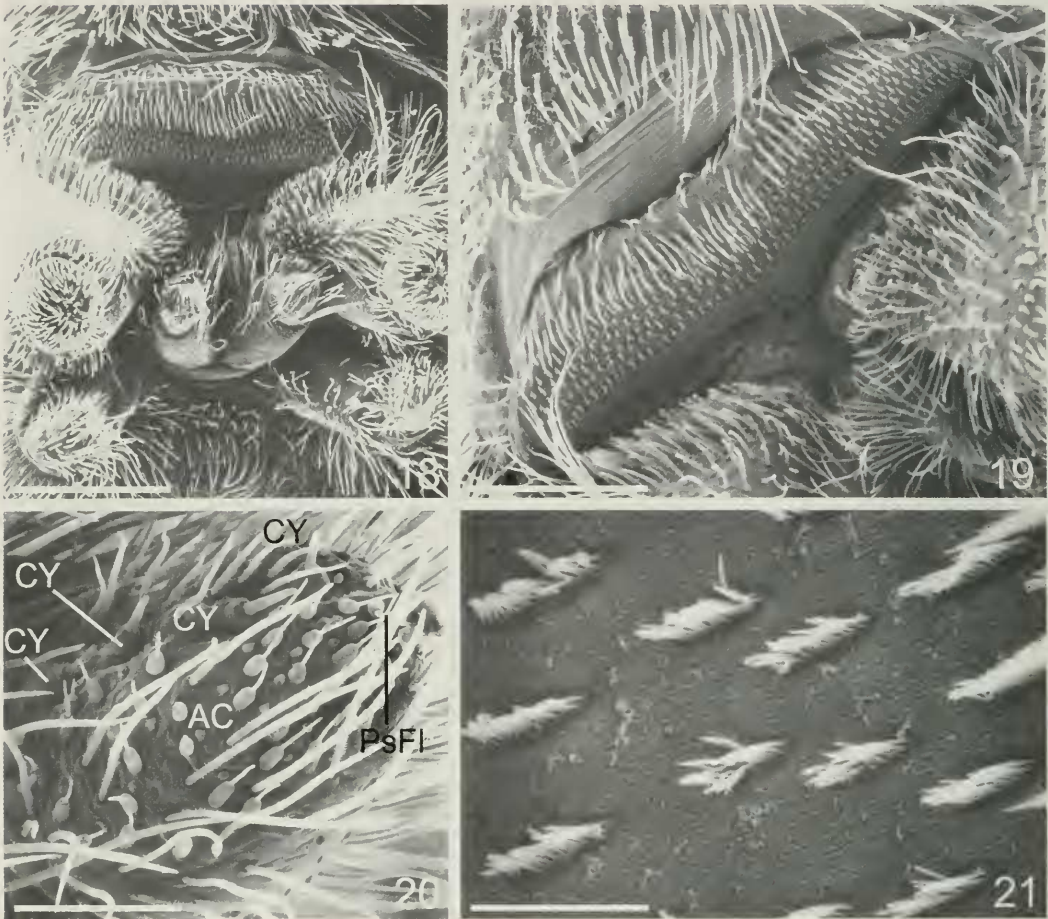
FIGURES 4–9. Legs of *Raecius*. 4, 5, 9. *R. scharffi*, male holotype. 6, 8. *R. asper*, female from Mann’s Spring. 7. *R. congoensis*, holotype. 4. Trichobothrial base, tibia IV. 5. Tarsal organ IV. 6. Close up of calamistral setae (center), with plumose and feathery setae at right. 7. Tarsus I, showing tarsal organ (line), trichobothrial base, and plumose setae. 8. Metatarsus IV showing calamistrum. 9. Tibia IV showing plumose and feathery setae. Scale bars: 4–5 = 10 μ m, 6–7 = 50 μ m, 8 = 1.0 mm, 9 = 100 μ m.



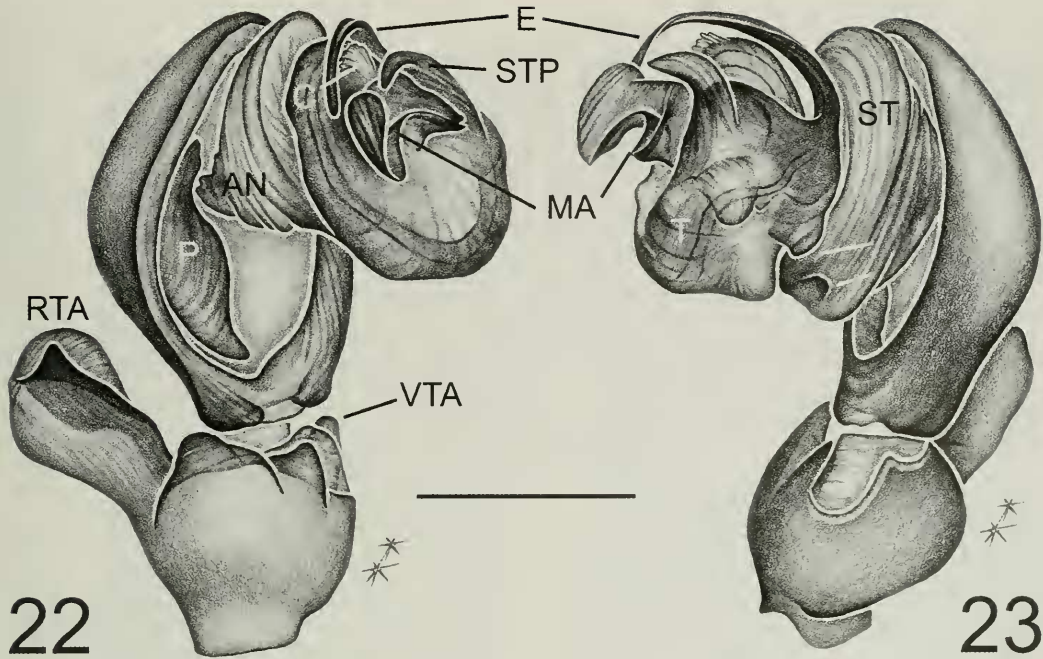
FIGURES 10–13. Right spinnerets of female *Raecius jocquei* paratype. 10. Overview. 11. ALS. 12. PMS. 13. PLS. AC = aciniform gland spigot(s), CY = cylindrical gland spigot(s), MAP = major ampullate gland spigot(s), mAP = minor ampullate gland spigot(s), PI = piriform gland spigot(s). Scale bars: 10 = 150 µm, 11–13 = 43 µm.



FIGURES 14–17. Left spinnerets of male *Raecius jocquei* paratype. 14. Overview. 15. ALS. 16. PMS. 17. PLS. AC = acini-form gland spigot(s), MAP = major ampullate gland spigot(s), mAP = minor ampullate gland spigot(s), N = nubbin of pseudoflagelliform gland spigot(?), PI = piriform gland spigot(s). Scale bars: 14 = 150 μ m, 15–17 = 43 μ m.



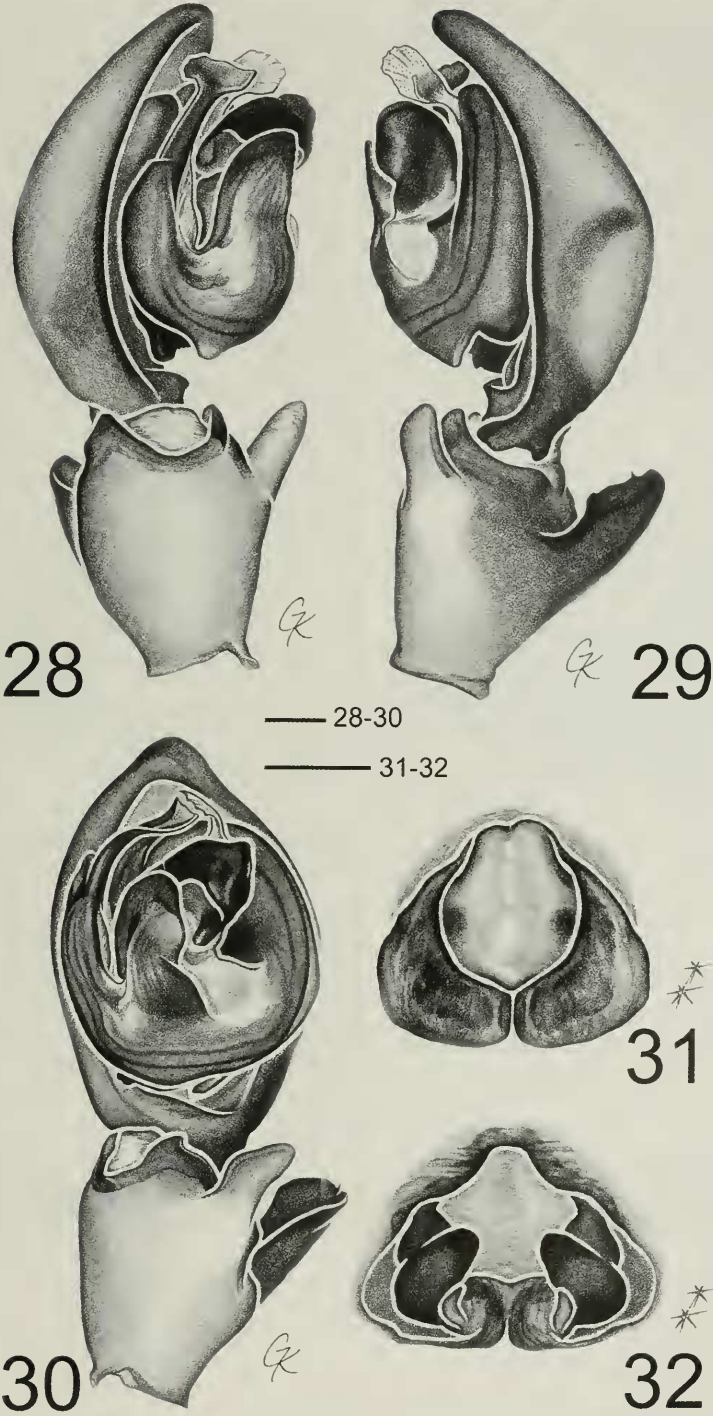
FIGURES 18–21. *Raecius* female spinning organs. 18, 20. *R. asper*, Mann’s Spring, Cameroon. 19, 21. *R. jocquei* paratype. 18. Spinnerets and cribellum, overview. 19. Cribellum. 20. Left PLS. 21. Close of up groups of cribellar spigots. AC = aciniform gland spigot(s), CY = cylindrical gland spigot(s), PsFI = pseudoflagelliform gland spigot. Scale bars: 18 = 500 μ m, 19 = 201 μ m, 20 = 100 μ m, 21 = 20 μ m.



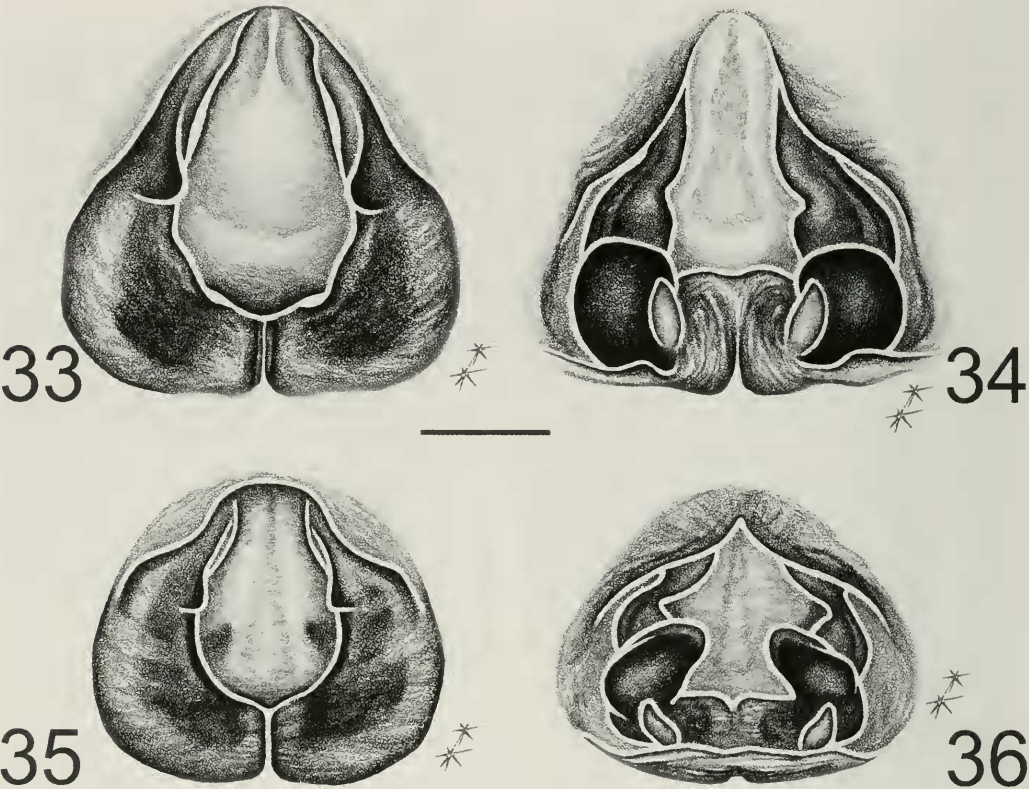
FIGURES 22–23. Expanded right pedipalpus of male *Raecius jocquei* paratype. 22. Retrolateral. 23. Prolateral. AN = anelli, C = conductor, E = embolus, MA = median apophysis, P = petiole, RTA = retrolateral apophysis of tibia, ST = subtegulum, STP = sclerotized tegular process, T = tegulum, VTA = ventral apophysis of tibia. Straight white lines on Fig. 23 to locking lobes of ST and T. Illustrations by JS. Scale bar = 0.5 mm.



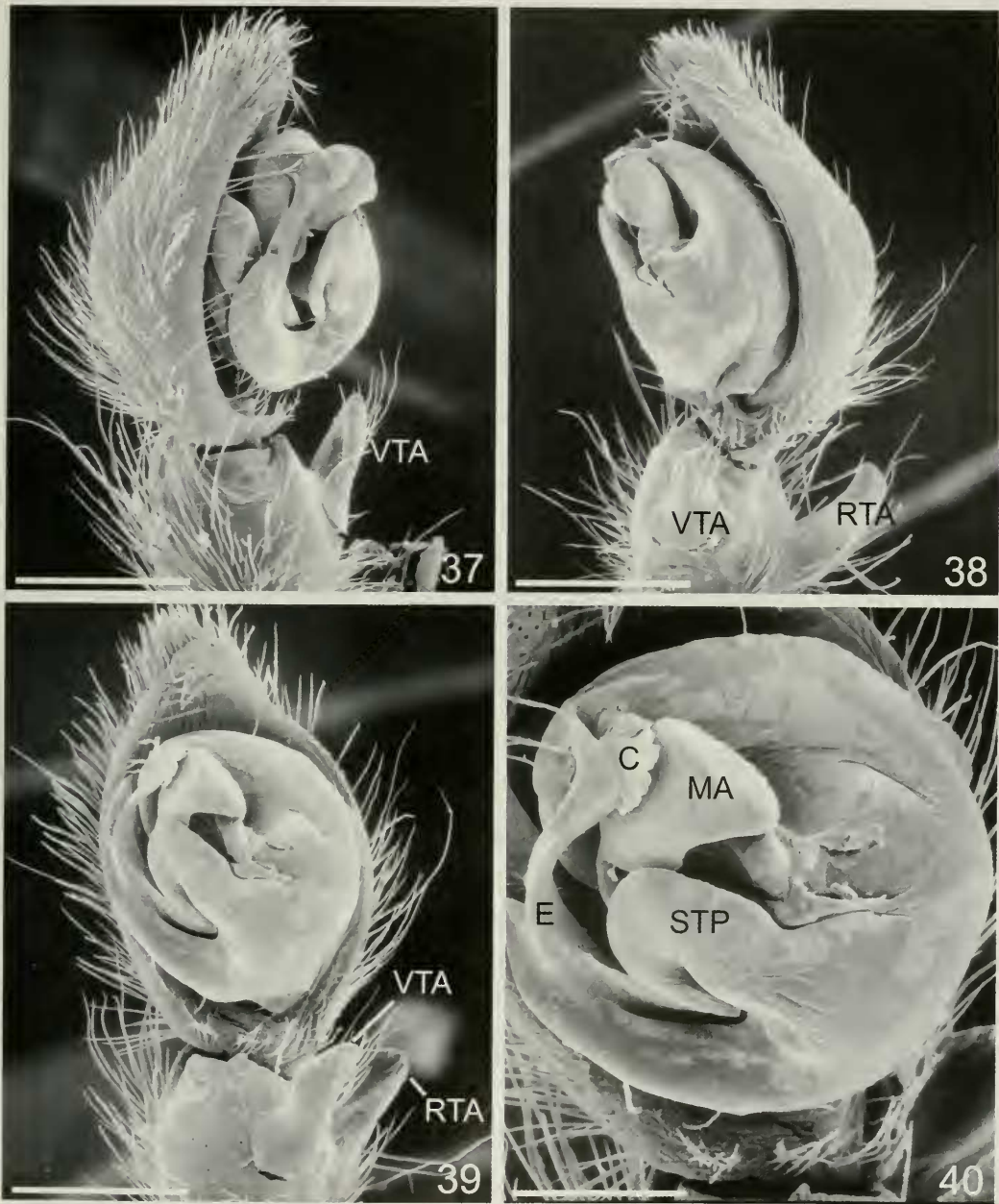
FIGURES 24–27. *Raecius asper*: specimens, webs and habitats from Mt. Cameroon. 24. Female, from above Mann’s Spring, 2100 m. 25. Burrow with collar of cribellate silk, grassland, 2100 m. 26. Mist forest at 1400 m. *Raecius* burrows typically found in rotting logs. 27. Burned grassland at 2100 m. *Raecius* burrows were common on ground. Figures 24, 25 and 27 by Gustavo Hormiga, 26 by Charles Griswold.



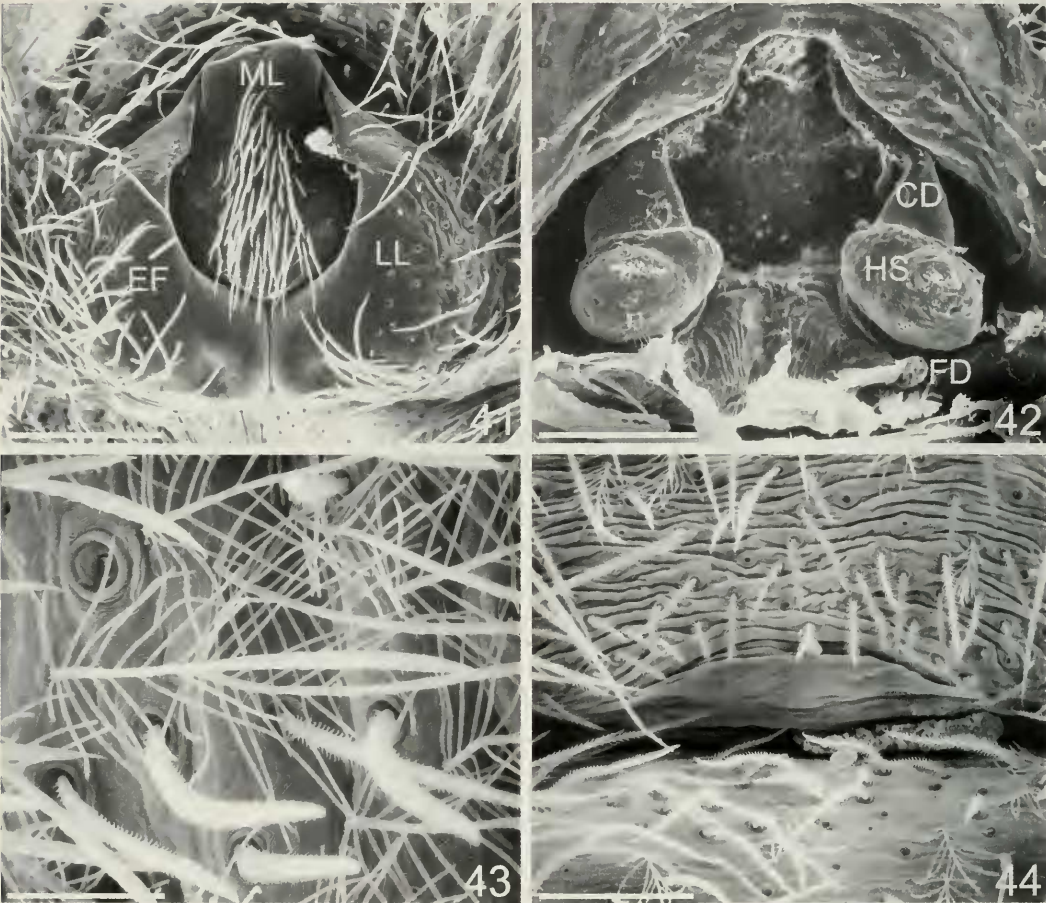
FIGURES 28–32. *Raecius asper*. 28–30. Male from Moca, Bioko Island, left pedipalpus. 28. Prolateral. 29. Retrolateral. 30. Ventral. 31–32. Female from Mann’s Spring, Mt. Cameroon. 31. Epigynum, ventral. 32. Vulva, dorsal. Illustrations 28–30 by GK, others by JS. Scale bars = 0.25 mm.



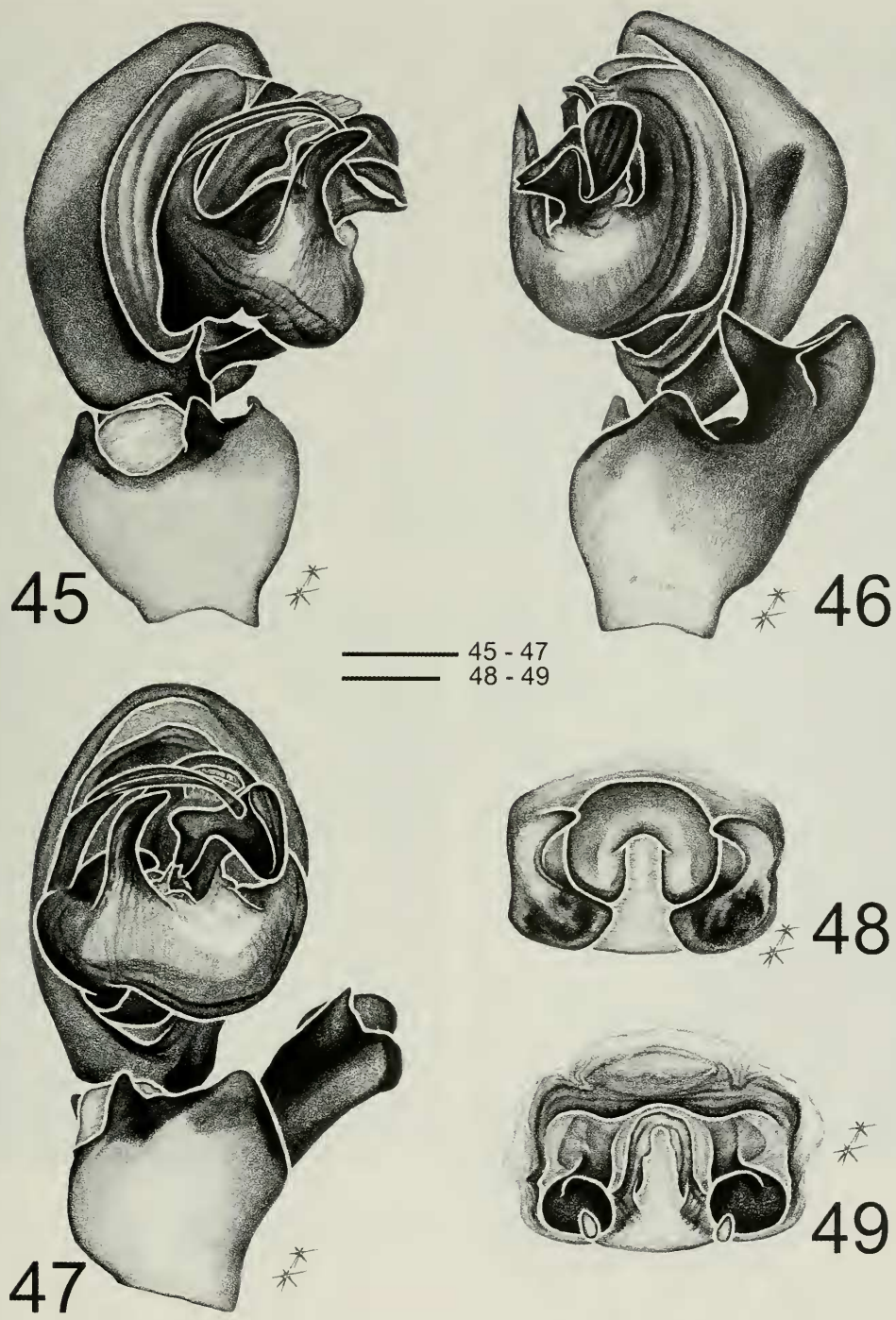
FIGURES 33–36. *Raecius asper*, female genitalia. 33–34. Bafuchu Mbu, Cameroon. 35–36. Mt. Cameroon, mist forest at 1400m. 33, 35. Epigyna, ventral. 34, 36. Vulvae, dorsal. Illustrations by JS. Scale bar = 0.25 mm.



FIGURES 37–40. *Raecius asper* male from Moca, Bioko Island, left pedipalpus. 37. Prolateral. 38. Retrolateral. 39. Ventral. 40. Apicoventral. C = conductor, E = embolus, MA = median apophysis, RTA = retrolateral apophysis of tibia, STP = sclerotized tegular process, VTA = ventral apophysis of tibia. Scale bars 37–39 = 600 µm, 40 = 300 µm.



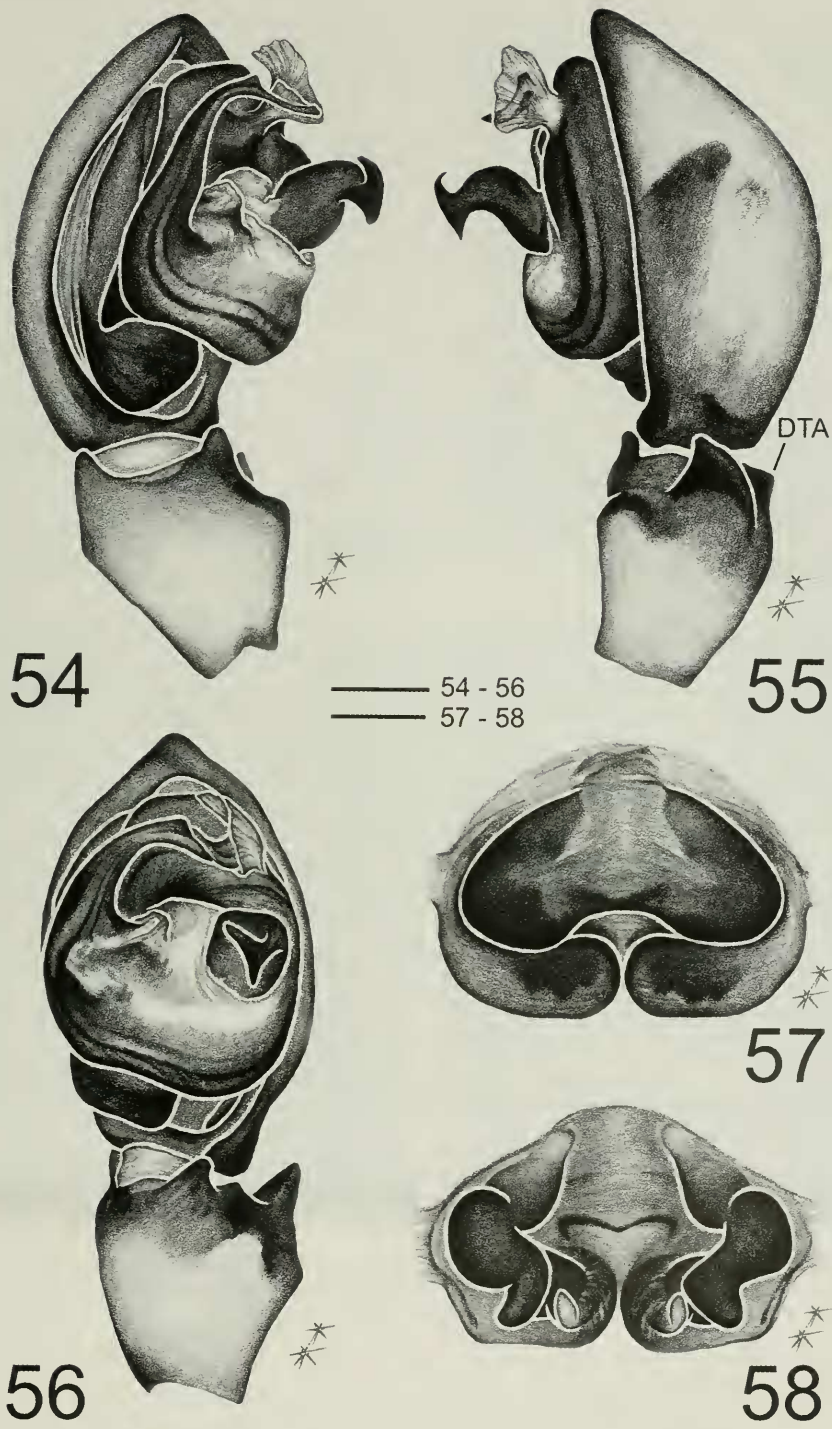
FIGURES 41–44. *Raecius* spp., abdomens. 41–42. *R. asper* female from Mann’s Spring, Mt. Cameroon. 43–44. *R. jocquei*, paratypes. 41. Epigynum, ventral. 42. Vulva, dorsal. 43. Venter of ♀ abdomen, showing plumose and feathery hairs. 44. Male epiandrous region. CD = copulatory duct, EF = epigynal fold, FD = fertilization duct, HS = head of spermatheca, LL = lateral lobes of epigynum, ML = median lobe of epigynum. Scale bars: 41 = 300 μm, 42 = 250 μm, 43 = 30μm, 44 = 75 μm.



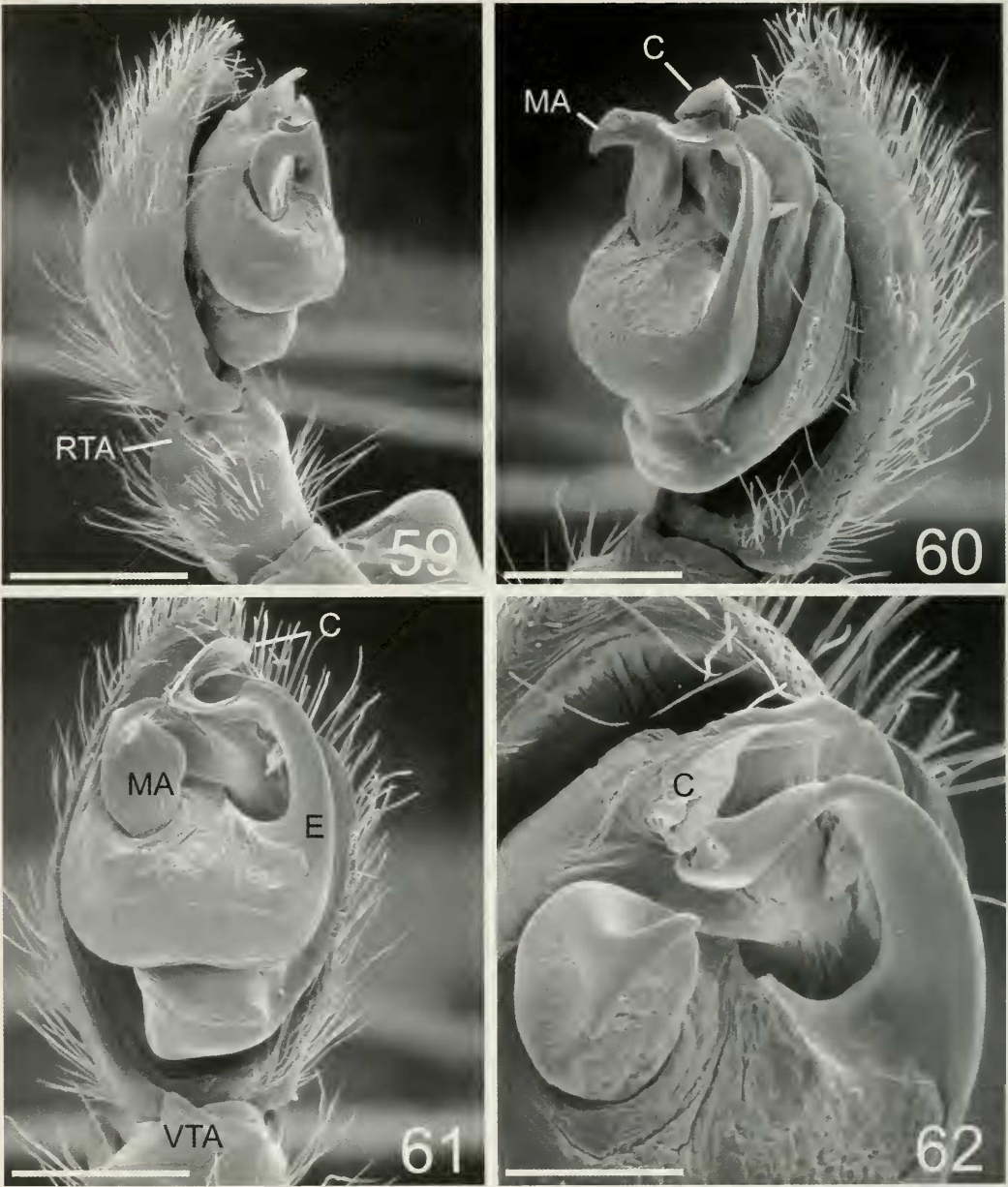
FIGURES 45–49. *Raecius jocquei*, Abengourou. 45–47. Left male pedipalpus. 45. Prolateral. 46. Retrolateral. 47. Ventral. 48. Epigynum, ventral. 49. Vulva, dorsal. Illustrations by JS. Scale bars = 0.25 mm.



FIGURES 50–53. *Raecius jocquei*, Abengourou, right male pedipalpus. 50. Retrolateral. 51. Prolateral. 52. Ventral. 53. Dorsal. C = conductor, E = embolus, MA = median apophysis, RTA = retrolateral apophysis of tibia, STP (1 and 2) = sclerotized tegular processes 1 and 2, VTA = ventral apophysis of tibia. Scale bars: 50, 53 = 430 μ m; 51, 52 = 300 μ m.



FIGURES 54-58. *Raecius* spp. 54-56. *R. scharffi*, holotype, left male pedipalpus. 54. Prolateral. 55. Retrolateral. 56. Ventral. 57-58. *R. congoensis*, female holotype. 57. Epigynum, ventral. 58. Vulva, dorsal. DTA = dorsal apophysis of tibia. Illustrations by JS. Scale bars = 0.25 mm.



FIGURES 59–62. *Raecius scharffi*, holotype, right male pedipalpus. 59. Retrolateral. 60. Prolateral. 61. Ventral. 62. Apicoventral. C = conductor, E = embolus, MA = median apophysis, RTA = retrolateral apophysis of tibia, VTA = ventral apophysis of tibia. Scale bars: 59 = 600 μ m; 60, 61 = 430 μ m; 62 = 200 μ m.



FIGURE 63. Map of Africa, showing locality records for *Raecius* species.

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